THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Less is heard now of dangers in the pace of the iron trade, and the lull of recent weeks has contributed to a healthy situation. The production and the consumption of steel-making pig iron seem to be in close balance, even with scrap accumulating in a way indicating that the large steel producers are using a maximum percentage of pig iron in their open-hearth practice. As yet nothing definite has developed as to purchases of pig iron by the Steel Corporation for May delivery, though merchant furnaces expect an inquiry for some amount within the next few days. There are indications that in all grades of pig iron there is now a more even adjustment of production and consumption than at any time this year, and the policy of pig iron buyers will doubtless be determined by the way in which the scale tips in the second month of the quarter. The fact that the Carnegie Steel Co. has 100 percent of its blast furnace capacity active this week, and that to do this an old furnace of relatively small capacity was blown in, indicates how the pressure from steel works keeps up. The statement presented at the meeting of the Steel Corporation directors this week, showing 5,597,560 tons of unfilled orders on the books March 31, gives a definite measure of the abounding activity of all branches of the industry.

The new buying of the past week while relatively light, emphasizes again the railroads as pillars of the existing prosperity. American Bridge Co. contracts closed include 23,000 tons for railroad bridges and there were booked in rails about 50,000 tons, bringing the total now on the books for this year to about 1,700,000 tons. Recent sales include 12,000 tons for St. Paul, 9,000 tons for the D., L. & W., 5,000 tons for the Western Allegheny, and 4,000 tons each for the Midland Valley and Richmond & Chesapeake. Traction rails are still a feature. The heavy forms of finished steel continue to lead in interest and in pressure upon the mills. Axle business in the Chicago district still attracts attention, the car works being steady buyers. As high as $3 premium has been paid for axle billets. The structural mills make no headway against the accumulation on their books, and the prospect of passing May day without serious strikes has added much to the optimistic view generally taken of the building situation. In the Pittsburg district the action of the associated manufacturers in the metal trades in voluntarily advancing wages is a good promise of steady consumption of iron and steel in important lines. On the Mesabi iron range the strike at the mines has collapsed, and the possibility of any serious interruption of iron ore production this season is considered quite remote.

The lighter forms of finished steel are still marked by large outputs by the mills, but no important new business. Season contracting in several of these lines makes the present wait a natural one. Meantime the concessions on a comparatively small tonnage of resale material are not significant. Merchant pipe has been advanced about $1 a ton and boiler tubes about $4, but with nothing in previous market conditions suggesting that such action might be expected.

The pig iron and raw material markets, while exhibiting no marked features, are not without interest. The easier feeling in Southern iron has put sellers on the alert for evidences of concessions from the $13.50 basis, and the possibilities of a longer wait by buyers are being carefully canvassed. Chicago reports considerable inquiry for malleable pig iron, one interest having a large purchase under consideration. In all other markets comparatively little business is in prospect. The purchase of the Hecla coke interests by the United States Steel Corporation takes a large output off the market and strengthens the position of merchant producers of coke. In iron ore the feature is the rapid reduction of stocks on Lake Erie docks, with the prospect that on May 1 these will be in actual tonnage lower than for several years, and in comparison with the current consumption of lake ores the smallest ever known. While the opening of the navigation season is not early it is not late, and the clearing off of the dock stocks will make the handling of 30,000,000 tons in the season an easier task than was thought possible.

PITTSBURG.

(Special Telegram.)

PITTSBURG, April 26.—The Steel Corporation's inquiry for Bessemer iron for May is not yet out, but it is known in a general way that the requirements will be 40,000 tons. A shortage of ore exists at a number of Valley furnaces and at some in this district. Unless there are heavy deliveries at lower lake ports in the next ten days, at least six furnaces will be compelled to shut down.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, April 26.

There has been little change in the iron and steel situation during the week. The pig iron market continues exceedingly quiet and there is a tendency to make concessions on all grades with the exception of Bessemer. In some finished lines the volume of new business continues light, but the specifications more than meet the current requirements of the mills and shipments are falling further behind. In the heavier lines, on the other hand, the new tonnage is more than satisfactory and the large number of inquiries which are increasing from day to day, indicate the placing of a tremendous tonnage in such lines as plates and shapes in the immediate future. There have been further additions to the rail tonnage during the past few days, and the mills are now carrying on their books over 1,700,000 tons for delivery this year. The structural tonnage closed has also been very heavy, one contract requiring

20,000 tons. The lack of new business in some finished lines and the continued lull in the pig iron market have led to the belief in some quarters that the present condition cannot long be sustained, but on the other hand it is asserted that when the present contracts for finished material are filled another heavy buying movement will set in, and as regards the pig iron situation, the fact that the furnaces are not pressing the consumers for business would indicate that their order books are comfortably filled through the remainder of the first half of the year.

The acquisition of the Hecla Coke Co.'s coke properties in the Connellsville region by the H. C. Frick Coke Co. is in line with the outlined policy of the United States Steel Corporation to further strengthen its position with regard to an increased fuel supply for the present and the future. By the addition of the 1,072 ovens of this company, the steel corporation controls 75 percent of the coke output of the upper Connellsville field, and 65 percent of the output of the entire Connellsville region. As two large Eastern steel companies and one on the lakes have almost solely depended on this operation for their coke supply, the other independent producers in the region will be asked to supply these large interests upon the expiration of the present contracts. Higher prices for coke may come unless these interests secure their own coking plants. At present the coke market is extremely dull and very low prices are being made. Spot furnace coke has sold as low as $1.80, and foundry coke for delivery through the second half is selling at $2.65 to $2.75.

This week the Carnegie Steel Co., by the blowing in of its Zanesville furnace, is operating 100 percent of its blast furnace capacity. This is the first time since the purchase of the Clairton and Union properties that all of the 51 furnaces of the company have been in operation at one time, and the blowing in of this old stack shows how great the pressure for iron for the company's steel works really is.

On Friday, April 21, the National Tube Co. advanced merchant pipe ½ point and boiler tubing 2 points. The advances amount to about $1 and $4 per ton respectively. The advent of the spring trade is the reason for the merchant pipe advance.

Pig Iron.—Transactions continue limited to lots of 500 tons and less and low prices are being made on foundry and forge iron. We note the sale of 500 tons of forge iron, prompt delivery at $15.75, Pittsburg, while on No. 2 Foundry $15.85 furnace can be readily done. The Bessemer Furnace Association continues to hold basic at $15.50 furnace, but this can be shaded 10 cents a ton. The Steel Corporation has not yet inquired for iron for May delivery, although an inquiry is expected within the next few days. A local founder is in the market for 15,000 tons of Bessemer for delivery the remainder of the year, but it is doubtful if this business will be closed this week, as the outside price the foundry is willing to pay is $15.25. Southern iron continues to be quoted at $13.50 Birmingham, but the disparity in favor of the Northern brands has eliminated Southern iron almost entirely for the present at least. We quote as follows:

Bessemer, Valley	$15 40 to 15 50
Bessemer, Pittsburg	16 25 to 16 35
No. 1 Foundry	17 50 to 17 75
No. 2 Foundry	16 75 to 17 10
Gray Forge, Pittsburg	15 70 to 15 75
Basic, Valley	15 35 to 15 50
Basic, Pittsburg	16 10 to 16 35

Ferro-Manganese.—Sales of carload lots are numerous at $50 to $51 Pittsburg. The advance expected by dealers has not yet materialized, but they assert that it will be some months before the ore shortage will affect the foreign production.

Steel.—Demand for prompt steel continues heavy, and there are offerings of foreign billets at $28 seaboard, duty paid. It is almost impossible to secure a quotation on open-hearth steel for immediate delivery, while Bessemer billets are held at $26 to $26.50 and slabs at $24.50. Rods are quoted at $34 to $35.

Muck Bar.—The market is quiet, and neutral bars are quoted nominally at $28.25 to $28.50 Pittsburg.

Skelp.—All of the pipe mills are suffering on account of the delays in the delivery of steel skelp and little material is to be had for prompt delivery. Grooved steel is held at 1.50c to 1.55c and sheared at 1.60c to 1.65c. Grooved iron, 1.75c, and sheared, 1.85c.

Rails and Track Material.—The rail orders now on the books of the mills aggregate 1,700,000 tons, the bookings last week aggregating nearly 50,000 tons. Traction rails are playing a prominent part in the new tonnage and considerable additional business is in view. Light rails are in good demand and prices are firm. We quote: Fifty lb. and over 500 tons, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 lb., $27 to $28; 20 lbs., $26 to $26.50; 25 to 45 lb., $25 to $25.50; angle bars for standard sections, 1.25c; spikes, 1.75c to 1.80c.

Structural Material.—Nearly all of the local structural fitting shops have orders on their books which will keep their plants in full operation for the next four months. During the week the American Bridge Co. secured a contract from the Atchison, Topeka & Santa Fe Railroad for railroad work requiring 20,000 tons and contracts from the Long Island and Chicago, Milwaukee & St. Paul railroads for 3,000 tons additional. We quote: Beams and channels up to 15 in., 1.60c; over 15 in., 1.70c; angles, 3 x 2 up to 6 x 6, 1.60c; zees, 1.50c; tees, 1.65c; angles from 3 to 16 in., 1.60c; universal and sheared plates 6¼ to 14 in., inclusive, 1.50c; over 14 in., 1.60c base.

Plates.—The demand for tank plate is gradually improving, but the mills are by no means pressed with specifications. There is no falling off in the demand for plates for steel car work and deliveries on open-hearth stock cannot be made in less than three months. Premiums are, however, not being received by any of the local mills. Quotations are unchanged as follows: Tank plates, 1¼ in. thick, 6¼ in. to 14 in., inclusive, 1.50c f. o. b. mill Pittsburg; over 14 in. up to 100 in., 1.60c. Extras are as follows per lb.: Flange and boiler steel, 10c; marine, A. B. M. A., and ordinary fire box, 20c; still bottom, 30c; locomotive firebox, 50c; plates over 100 in. up to 110 in. in width, not less than 5c per lb. extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to 120 in., 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific Coast.

Bars.—Present steel bar contracts do not expire until July, and the large harvesting interests are not expected in the market until June. By that time the crop situation will be well outlined and the amount of buying by these interests will indicate to a very great extent how long the present activity will be continued. The new business in both iron and steel bars is light. Quotations are unchanged as follows: Bar iron, 1.65c to 1.69¾c Pittsburg; hoops, 1.65c, and bands, 1.50c, both taking bar extras. Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c, net; channels, angles, zees and tees, under 3 in. 1.65c. The following differentials are maintained on steel: Less than 2,000 lb. of a size and not less than 1,000 lb., 10 cents advance; less than 1,000 lb. of a size, 30 cents advance.

Sheets.—Specifications continue heavy, but new business is far from satisfactory and ruling prices cannot be obtained. We quote black sheets in carload lots as follows: No. 30, 2.80c; No. 29, 2.70c; No. 28, 2.40c; No. 27, 2.30c;

Nos. 25-26, 2.25c; Nos. 23-24, 2.20c; Nos. 18-20, 2.15c; No. 16, 2.10c; Nos. 12-14, 2.05c; No. 9, 2c; No. 8, 1.95c. Galvanized, No. 30, 4.35c; No. 29, 3.85c; No. 28, 3.45c; No. 27, 3.25c; Nos. 25-26, 3.05c; Nos. 23-24, 2.85c; Nos. 18-20, 2.70c; No. 16, 2.55c.

Wire and Wire Nails.—The movement of wire nails has improved considerably during the week, while the demand for fencing is extremely heavy. The cut nail market is quiet and prices are unchanged. We quote as follows: Wire nails, jobbers' carload lots, 1.80c; retailers' carload lots, 1.85c, and less than carloads, 1.95c; painted barb wire, 1.95c for jobbers in carloads; retailers' carloads, $2, and less than carloads, 2.10c, with 30c for galvanizing. Annealed smooth fence wire is held at 1.65c, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron cut nails are held at 1.85c Pittsburg, and steel at 1.75c.

Pipe and Tubes.—On Friday, April 21, merchant pipe was advanced ½ point and boiler tubing two points. The advance in merchant pipe was made in anticipation of the heavy spring demand. Discounts to consumers, carload lots, f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are revised as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	67	51	65	49
⅜ to 6 inches	75	65	73½	63½
⅜ and ½ inch	71	59	69	57
7 to 12 inches	70	55	67½	53
Extra Strong Plain Ends.				
⅛ to ⅜ inch	60	48	58	46
½ to 4 inches	67	55	65	53
4½ to 8 inches	63	51	61	49
Double extra strong plain ends, ½ to 8 inches	56½	45½	54½	43½

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inches	44	41
1 ¾ to 2½ inches	56	41
2½ inches	58	46
2¾ to 3 inches	64	53
6 to 13 inches	56	41

Less than carloads 2 points less.

Merchant Steel.—All of the mills continue to operate at their capacity and new business is heavy. Prices have not advanced in proportion to the advance in raw material and it is the policy of the manufacturers to hold prices in check in order to stimulate further buying. We quote: Cold rolled and ground shafting, 50 percent off in carload lots, and 45 off in less than carload lots, delivery in base territory; tire steel, 1.65c to 1.75c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.75c to 1.85c; smooth finished machinery steel, 1.80c to 1.85c; toe calk, 2.05c to 2.15c.

Old Material.—The market is extremely quiet and prices are lower. Heavy melting stock is offered at $16, Pittsburg and No. 1 wrought scrap has sold as low as $19. Low phosphorus stock on the other hand is quoted by local mills at $21, but no sales are made at this price. We revise quotations, gross tons, as follows: Heavy melting stock, $16 to $16.25; cast scrap, $15 to $15.50; sheet scrap, $14.75 to $15.25; cast borings, $10.75 to $11; No. 1 wrought scrap, $19.00; low phosphorus material, $20 to $21.

Coke.—The continued shipment of stock coke from the Connellsville region indicates that the recent accumulation amounted to over 500,000 tons rather than 300,000 tons as was claimed by the producers. Spot coke is very weak and sales of furnace coke have been made during the week at $1.80, while we note the sale of 1,400 cars of foundry coke for delivery the balance of the year at $2.70 and $2.75. During the week ending April 15, the upper Connellsville region produced 269,310 tons and the lower region 80,819 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, April 25.

After particularly rapid work in construction, the Republic Iron & Steel Co. has completed its rail mill at Youngstown, O., which was authorized on Oct. 19 last. The first sections were rolled on Saturday, April 22. This plant will have an output of 1,500 tons of standard sections daily when running to full capacity. It is not expected, however, that the mill will run heavily on rails for some time, as only a moderate tonnage has been booked to date. It is more than likely it will be put on sheet bars, in view of the scarcity of this product.

Optimism is the keynote of the local market. All finished materials are in active demand, in some departments an embarrassment of orders and specifications being felt. Pig iron is somewhat more active, especially Northern and malleable grades, several round lots of both having been closed since our last report. An advance of $1 a ton on merchant pipe and $2 a ton on boiler tubes was announced April 20 by the leading producer. Revised quotations are given elsewhere. The activity of railroads in purchasing new cars has created a strong demand for axle billets in this market. Several round lots are being figured on by car builders, ranging from 5,000 tons downwards. The scrap market is soft as a result of the heavy tonnage recently sold by railroads. Bar iron is improving.

Pig Iron.—Local interest centers in the demand for malleable iron. Within the past week a good inquiry has sprung up, the lots figured on ranging from 30,000 tons down. Deliveries called for extend through the last half, though many are figuring only on third quarter requirements. There is some fear expressed that the supply of malleable iron from local furnaces will not meet the increasing demand. One interest is practically out of the market, having only a small tonnage to dispose of which it is eking out to its friends, while the tonnage which the other leading seller of this product has to offer is scarcely sufficient to meet the requirements already indicated in the inquiries it has received. There will be some scaling of the tonnages pending when these melters are ready to buy, as it is the custom to figure on larger supplies than are actually bought; but even with this reduction, there is a possibility that the supply will fall short of the demand. The situation with regard to foundry irons is without material change. Inquiry keeps up, though the tonnage placed on furnace books is light. Sellers are not pushing matters, being confident of the strength of their position, and are waiting for buyers to get through with sounding the market. The fact develops as the season advances that a very small percentage of buyers have covered their requirements beyond the middle of the summer. Deliveries on current contracts are sufficient for present needs, though in view of the improved condition of the foundry trade generally, there is a belief on the part of sellers that some will come into the market sooner than was originally anticipated. Prices remain on the basis of $17.50 for Northern No. 2 foundry, and $13.50 Birmingham for Southern No. 2 foundry. We quote as follows:

Lake Superior charcoal	$18 00 to 18 50
Northern Foundry No. 1	18 00
Northern Foundry No. 2	17 50
Northern Foundry No. 3	17 00
Northern Scotch Foundry	18 50
Ohio Strong Softeners No. 1	19 30 to 19 80
Ohio Strong Softeners No. 2	18 30 to 18 80
Southern Foundry No. 1	17 65
Southern Foundry No. 2	17 15
Southern Foundry No. 3	16 65
Southern Foundry No. 4	16 40
Southern No. 1 Soft	17 65
Southern No. 2 Soft	17 15
Southern Gray Forge	16 40
Southern Mottled	16 40
Southern Silveries (4% to 6% Silicon)	18 65 to 19 15
Jackson Co. Silveries (6% to 8% Silicon)	21 30 to 22 30
Jackson Co. Silveries (8% to 10% Silicon)	12 30 to 23 30
Alabama and Georgia Car Wheel	21 15
Malleable Bessemer	17 50
Basic Iron	17 65 to 18 15

Billets.—The principal transaction of the week was the

order placed by a Milwaukee machinery house for 1,200 tons of forging billets at $29 Chicago, a premium of $3 a ton. Several other orders for this material were placed last week with local manufacturers, all of them being taken at a premium above official prices. Demand for axle billets is strong, one local car inquiry amounting to 5,000 tons. Our quotations below are subject to change according to the relations existing between the buyer and seller and the tonnage demanded. We quote forging billets, 4 x 4 and larger, up to but not including 10 x 10, up to .25 carbon, $29; up to but not including .60 carbon, $1 extra. Rerolling billets, Bessemer or open-hearth, 4 x 4 and larger, $26 and upwards; billets, 3⅞ in. and smaller and sheet and tin bars, $27 and upwards; according to tonnage and delivery.

Bars.—Specifications for steel bars and shapes are very heavy and tax the capacity of mills to the utmost. On angles and other light shapes producers are falling behind in deliveries. There is a better demand for bar iron than formerly, though there is yet room for considerable improvement. We quote carload lots, mill shipments, Chicago delivery, as follows: Bar iron, 1.60c to 1.65c; Bessemer and open-hearth bars and bands, 1.66½c base, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 1.81½c base, full extras. Store trade is active and prices are firm. We quote bar iron, 1.90c base, full extras; soft steel bars and bands, 1.85c to 1.95c base, full extras; soft steel angles, channels and tees, under 3 in., 1.95c to 2.05c; hoops, 2.20c base, full extras.

Sheets.—The pressure of demand continues without abatement. All gauges are sharing in the movement, though the inquiry is stronger for blue annealed sheets. Specifications for galvanized material are also highly satisfactory. An item of interest in this connection, is the announcement of the Inland Steel Co., of this city that it will put in a galvanizing plant at its Indiana Harbor Works. Only one pot of a capacity of 30 tons will be installed at first, though it is contemplated to increase this department later. Prices are firm and without change. We quote on carload lots, mill shipments, Chicago delivery, as follows: Blue annealed sheets, Nos. 9 and 10, 1.86½c to 1.91½c; Nos. 11 and 12, 1.91½c to 1.96c; Nos. 13 and 14, 1.96½c to 2.01½c; Nos. 15 and 16, 2.06½c to 2.11½c. On box annealed, one pass cold rolled, we quote Nos. 18 and 20, 2.31½c to 2.36½c; Nos. 22 and 24, 2.36½c to 2.41½c; Nos. 25 and 26, 2.41½c to 2.46½c; No. 27, 2.46½c to 2.51½c; No. 28, 2.56½c to 2.61½c; No. 29, 2.66½c to 2.71½c; No. 30, 2.76½c to 2.81½c. We quote on lots from warehouse stocks as follows: No. 10, 2.10c to 2.15c; No. 12, 2.15c to 2.20c; No. 14, 2.20c to 2.25c; No. 16, 2.30c to 2.35c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.85c; No. 28, 2.85c to 2.95c; No. 29, 3c to 3.05c. Galvanized sheets, mill shipments, Chicago delivery, are quoted as follows: Nos. 12 and 14, 2.56½; No. 16, 2.71½c; Nos. 18 and 21, 2.86½c; Nos. 22 and 24 3.01½c; No. 26 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c. Jobbers' prices on lots from store have also been revised, and are now as follows: Nos. 10 to 14 inclusive, 3.10c; No. 16, 3c; Nos. 18 and 20, 3.10c; Nos. 22 and 24, 3.25c; No. 26, 3.50c; No. 27, 3.70c; No. 28, 3.95c; No. 29, 4.40c; No. 30, 4.85c.

Structural Steel.—The most noteworthy feature of the local market is the advance in prices announced by Chicago jobbers, ranging from $2 a ton upwards. This action brings store prices in line with the premiums exacted by producers for prompt delivery of material. Very little new tonnage has been added to mill books in the week under review, as few have any to offer. In quoting official prices on carload lots, mill shipments, Chicago delivery, we make the reservation that premiums are asked according to the size of the order and the shipment required: Beams and channels, 3 to 15 in. inclusive, 1.76½c; angles, 3 to 6 in., ¼ in. and heavier, 1.76½c; angles, larger than 6 in., on one or both legs, 1.86½c; beams larger than 15 in., 1.86½c; zees, 3 in. and over, 1.76½c; tees, 3 in. and over 1.86½c; with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. We quote prices from store as follows: 2.10c to 2.25c for angles, beams and channels, base sizes, with 2.20c to 2.30c for 18, 20 and 24-in. beams; tees and zees, 2.15c to 2.25c. These prices are for either random lengths or cut to specifications in excess of 5 feet.

Plates.—There is no change to note regarding the local situation. Specifications are very heavy, and it is almost impossible to get quick deliveries except from jobbers and a few independent mills. These are asking fancy premiums and getting them. We quote on carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼ in. and heavier, 6⅛ in. to 100 in., 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base, all full extras. Plates, 3-16 in. thick, $2 extra; gauges 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store quotations are as follows: Tank steel, ¼ in. and heavier, up to and including 72 in. wide, 2c; over 72 in. wide up to 100 in., 2.10c; over 100 in. wide usual mill extras, 3-16 in. up to but not including 72 in. wide, 2.10c; 3-16 in., 72 in. wide, 2.35; flange steel, 25c extra; heads, 25c extra.

Rails and Track Supplies.—The inquiry for standard sections continues without abatement, though it is practically all referred to Eastern mills of the corporation for shipment. Several round lots were closed up in the week under review, far Western roads being the buyers. The Republic Iron & Steel Co. announces that its rail mill at Youngstown was started up for the first time Saturday, April 22. Spikes have been advanced $1 a ton; with this exception prices of rails and track supplies are unchanged. We quote heavy section in 500 ton lots and over f. o. b. mill, $28; less than 500 tons to carload lots, $30; less than carload lots, $32. Light rails are as follows; 12-lb. sections, $27; 16-lb., $26; 20 and 25-lb., $25; 30, 35, 40 and 45-lb., sections, $24, all f. o. b. Milwaukee mill. Track supplies, f. o. b. Joliet mill. Angle bars, 1.40c to 1.50c; spikes, first quality, 1.75c to 1.80c; track bolts, 3¼ x ¾, with square nuts, 2.40c to 2.50c per lb., with hexagon nuts, 2.55c to 2.65c.

Merchant Steel.—Undiminished demand is reported by mills, every producer operating to full capacity in the effort to keep pace with current consumption. Prices are firm and without change. On carload lots, mill shipments, Chicago delivery, we quote as follows: Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c; plow steel, 2.20c and upward according to quality; toe calk steel, 2.21½c. Cold rolled shafting, 50 percent off in carload lots and 45 percent in less than carload lots. Crucible tool steel, 61½c to 8c; special grades of tool steel, 13c and upwards.

Merchant Pipe.—The leading producer advanced its prices on April 20 one-half a point, which is equivalent to $1 a ton. The demand continues strong for all sizes. We have revised our quotations, and quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inches	65.35	49.35	63.35	47.35
⅜ to ½ inches	69.35	57.35	67.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches	68.35	53.35	66.85	51.35
EXTRA STRONG PIPE.				
⅛ to ⅜ inches	58.35	46.35	56.35	44.35
½ to 4 inches	65.35	53.35	63.35	51.35
4½ to 8 inches	61.35	49.35	59.35	47.35
DOUBLE EXTRA STRONG PIPE.				
¼ to 8 inches	54.35	43.35	52.35	41.35

Boiler Tubes.—Concurrent with the advance in pipe last week, boiler tubes were put up two points, or $2 a ton. A heavy business continues to be booked by local selling interests, and on some sizes deliveries are hard to obtain. We have revised our prices, and quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	Steel.	Iron.	Seamless.
1 to 1½ inches	40.38	37.35	53.00
1¾ to 2¼ inches	52.35	37.35	40.00
2½ inches	54.35	42.35	43.00
2¾ to 5 inches	60.35	49.35	
			Up to 4½ inches 50.50
6 to 13 inches	54.35	39.35	

Less than carload lots from store, as follows:

	Steel.	Iron.	Seamless Steel
1 to 1½ inches, inclusive	38	33	42½
1¾ to 2¼ inches, inclusive	48	33	35
2½ inches, inclusive	50½	33	37½
2¾ to 5 inches, inclusive	58	45½	47½
6 inches and larger	48	33	

Cast Iron Pipe.—There were no new municipal inquiries up in the week under review, and those that are pending, including the 1,000 tons for Duluth, 4,000 tons for St. Louis and 2,400 tons for Alpena, Mich., are still unlet. Prices are without change, and we quote carload lots, Chicago delivery, as follows: 4-in., $29; 6-in and larger, $28; gas pipe, $1 a ton higher.

Wire Products.—No change in prices has been announced, though the market is exceptionally strong. Demand is heavy for all farming products, producers continuing to restrict orders to 60 days' requirements. The manufacturing trade is brisk. We quote carload lots to jobbers, Chicago delivery, as follows: Wire nails, $1.95; painted barb wire, $2.10; galvanized barb wire, $2.40; smooth annealed wire, $1.80; smooth galvanized wire, $2.10; polished staples, $2.05; galvanized staples, $2.35. Less than carload lots to jobbers are 5 cents higher than above prices. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10 cents extra on less than carload lots. Bale ties are unchanged at 82½ and 5 percent and 85 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet and DeKalb, with actual freight allowed not exceeding 30 cents per 100 lb.

Foundry Coke.—Little change is apparent in the local market. Prices are kept down by the demurrage coke on track which is frequently offered at very attractive figures. We quote standard 72-hour Connellsville from $2.75 to $3.00 at the ovens. Wise county, Va., coke is quoted $2.90 ovens or $5.15 Chicago. Other brands of Virginia and West Virginia cokes, at $2.50 to $2.75 ovens.

Old Material.—The recent heavy sales of scrap by railroads have weakened the local market, and prices are down from 50 to 75 cents a ton. Several additional railroad lists are being figured on, including one of 6,000 tons offered by the Burlington, which is expected to still further soften the market. We have revised our prices and quote gross tons, as follows:

Old steel rails (4 feet and over)	$15 50 to 16 00
Old steel rails (less than 4 feet)	15 00 to 15 50
Old iron rails	19 50 to 20 00
Relaying rails, subject to inspection	22 00 to 22 50
Old wheels	15 75 to 16 25
Heavy melting steel	14 00 to 14 50
Mixed country steel	11 00 to 11 50
Low phosphorus scrap (.05 and under)	14 50 to 15 00

The following quotations are for net tons:

No. 1 R. R. wrought	16 00 to 16 50
No. 2 R. R. wrought	15 00 to 15 50
Shafting	17 00 to 17 50
Dealers' forge, No. 1	12 00 to 12 50
Wrought pipe and flues	11 25 to 11 75
No. 1 cast, 150 lb. and less	13 00 to 13 50
No. 1 mill	11 00 to 11 50
No. 1 Busheling	11 50 to 12 00
No. 2 Busheling	10 50 to 11 00
Country sheet	8 00 to 8 50
No. 1 boilers, cut	11 00 to 11 50
Boiler punchings	13 50 to 14 00
Iron car axles	21 00 to 21 50
Steel car axles	16 50 to 17 00
Iron axle turnings	11 50 to 12 00
Cast borings	7 50 to 8 00
Mixed borings, etc.	7 50 to 8 00
Machine shop turnings	10 50 to 11 00
Railroad malleable	13 00 to 13 50
Agricultural malleable	12 00 to 13 00
Stove plate and light cast scrap	10 50 to 11 00
Old iron splice bars	17 00 to 17 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, April 26.

Iron Ore.—Statistics compiled by the Lake Superior Iron Ore Association show that on April 1 there were only 3,443,186 tons of ore on Lake Erie docks against 5,398,409 tons on April 1, 1904, and 4,530,032 tons on March 1, 1905. The movement from docks to furnaces during March was 1,086,846 tons and it is expected that the tonnage moved in April will be fully as large. If this be true, there will be only about 2,300,000 tons on dock May 1, a smaller tonnage than on May 1 of any year since 1900, when 1,563,513 tons was on dock. It is not improbable that the ore on dock May 1 will be less than 2,000,000. If the ratio of ore on dock May 1 to the total shipments for the preceding season be considered, it is certain that the figures for May 1, 1905, will make a new low record.

The week has been marked by little progress toward the opening of navigation. Many vessels have been fighting their way through the ice and damage to the amount of several hundred thousand dollars has been done to their hulls. Vessel men estimate that this damage, the expense of sending the ice crusher to Lake Superior, and decrease in earnings resulting from the delay in opening navigation make a total loss of about $1,000,000. After two plates of one steamer of the steel corporation fleet had been cracked by striking an ice floe, all masters of vessels of that fleet in port were ordered last Friday not to start out until conditions became more favorable. It is not expected that many vessels will sail before May 1. Only three or four boats with ore have reached Lake Erie ports and the shipments for April will be much smaller than it was expected two weeks ago they would be. Owing to inability of the carriers to load, there is considerable congestion at upper lake ports. Many dock pockets are filled, as are also all available cars, and there has been a general curtailment of operations from mines to docks. The ore market is quiet and without any feature of special interest. Quotations are as follows: Old range Bessemer (56.70 percent iron natural, .05 phosphorus), $3.85 to $4; Mesabi Bessemer, same content, $3.65 to $3.75; old range non-Bessemer (52.80 percent iron natural), $3.35; Mesabi non-Bessemer (52.80 percent iron), $3.20.

There is some activity in the lake freight market, chartering being done at 70 cents from Marquette and 75 cents from the head of the lakes, which are also the rates of the season contracts.

Pig Iron.—In spite of the fact that there is almost universal complaint among sales agents that it is difficult to sell iron, a fair tonnage has been purchased. One Cleveland interest has in two weeks sold 13,000 tons of foundry iron on a basis of about $16 for No. 2. Reports from jobbing foundries are not very satisfactory, as many of them are not working to their capacity. Little is being done in basic, for which the usual quotation is now $15.50 at the furnace. Southern is quiet, but firm, at $13.50, Birmingham, for No. 2. Coke is dull, with foundry selling at $2.75 and furnace at $2, although one large interest is asking $2.85 for foundry coke for prompt shipment and $3 for the last half. We quote as follows, Cleveland delivery:

Bessemer	$16 25 to 16 35
No. 1 Foundry	16 75 to 17 00
No. 2 Foundry	16 25 to 16 50
No. 3 Foundry	15 50 to 15 75
No. 2 Southern	17 35
Gray Forge	15 75 to 16 00
Gray Forge, Southern	15 85 to 16 00
Lake Superior charcoal	18 00 to 18 50

Finished Material.—Jobbers are still doing record breaking business from stock, orders coming in some cases from unexpected and unusual sources. The builders of engines report some improvement in business, but complaints of slackness in orders are still common among many of the smaller manufacturing concerns, while the great producers of finished material are still far behind in their deliveries.

The advance of the price of boiler tubes 2 points and of merchant pipe ½ point came as a distinct surprise to the trade, as business in pipe has not been brisk in all markets and the demand for boiler tubes has been limited, even at prices several points below the announced quotations. Forges are not, as a rule, busy and the proprietors say that they are unable to advance quotations in harmony with prevailing prices for billets. For small lots of billets from stock, as high as $32 and $33 has been paid this week. The demand for sheets is fair. The prices of the principal producers through jobbers are as follows: Cleveland delivery, the freight from Pittsburg being 9½ cents; mill sales of black sheets in carload lots, No. 10, 1.89½c; Nos. 11-12, 1.94½c; No. 14, 2.04½c; No. 16, 2.09½c; No. 27, 2.49½c; No. 28, 2.59½c. Galvanized mill sales, No. 14, 2.64½c; No. 16, 2.74¼c; Nos. 18-20, 2.89½c; Nos. 22-24, 3.04½c; Nos. 25-26, 3.24½c; No. 27, 3.44 1-3c; No. 28, 3.64½c. Out of stock, black sheets, ¼ in., 1.95c; 3-16 in., 2.05c. Blue annealed, No. 10, 2.15c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.35c. One pass cold rolled: Nos. 18-20, 2.55c; Nos. 22-24, 2.60c; No. 26, 2.65c; No. 27, 2.70c; No. 28, 2.80c; No. 30, 3.20c. Galvanized out of stock, No. 16, 2.95c; Nos. 18-20, 3.05c; Nos. 22-24, 3.20c; No. 26, 3.40c.

Old Material.—The depression which has been decided for several weeks, contrasting strangely with the activity of nearly all mills, continues and the following prices could probably be shaded on desirable business. We quote gross tons, Cleveland:

Old iron rails	$22 50 to 23 00
Old steel rails (over 6 feet)	16 00 to 16 50
Old steel rails (under 6 feet)	16 00 to 16 50
Old car wheels	16 00 to 16 50
Steel boiler plate	13 00 to 13 50
Steel axles	17 50 to 18 00
Malleable iron (railroad)	15 50 to 16 00
Malleable iron (agricultural)	14 50 to 15 00
Heavy steel	16 00 to 16 50

We quote as follows, net tons:

No. 1 R. R. wrought	16 50 to 17 00
No. 1 busheling	14 00 to 14 50
No. 1 machine cast	14 50 to 15 00
Iron axles	22 00 to 22 50
Axle turnings	12 00 to 12 50
Wrought turnings (free from cast)	11 50 to 12 00
Grate bars	10 00 to 10 50
Pipes and flues	12 50 to 13 00
Tank iron	10 50 to 11 00
Hoop and band iron	9 00 to 10 00
Sheet iron	7 00 to 8 00
Wrought drillings	11 50 to 12 00
Stove plate	10 50 to 11 00
Cast borings	8 00 to 8 50

CINCINNATI.

April 25.

Pig Iron.—The past week has been a repetition of the preceding one in the pig iron market and there is practically no inquiry. Buyers continue indifferent as to their future requirements and being generally supplied up to July 1 and even in some cases well into the summer months, sales agencies are coming to believe that the present quietness will very likely continue until existing contracts are nearly worked out. The general policy of Southern furnaces is to adhere to the price which has been maintained now for some time and $13.50 Birmingham for No. 2 foundry is still the quotation for the Southern iron. Some investment iron, it is believed, could now be bought on a firm offer of $13.25. The lack of orders through the dull period now being experienced has caused a feeling among furnace representatives that at any time some seller might shade the price, and there have been intimations, without definite details, however, that offers of $13.25 have been solicited. From the attitude of buyers it would seem that this reduction, if actually made, could hardly be expected to result in any business, as their expressed position is that by waiting a more important advantage than 25c a ton would accrue to them. There is no change in the quotations for Northern iron and $15.75 furnace for No. 2 foundry is the ruling price. There has hardly been enough demand or inquiry for the past two weeks in this territory to test the market for minimum prices on either Northern or Southern irons; but under lack of business sentiment is undoubtedly weaker. At this writing, however, quotations are unchanged. We quote f. o. b., Cincinnati:

Southern Foundry No. 1	$16 75
Southern Foundry No. 2	16 25
Southern Foundry No. 3	15 75
Southern Foundry No. 4	15 50
Southern Foundry No. 1, soft	16 75
Southern Foundry No. 2, soft	16 25
Gray Forge	15 25
Northern Foundry No. 1	17 40 to 17 65
Northern Foundry No. 2	16 90 to 17 15
Northern Foundry No. 3	16 40 to 16 65
Southern Charcoal	19 50 to 19 75

Finished Material.—The market for steel products continues active with good demand and prices well maintained. Bar iron, however, remains quiet but steady and not quotably changed. Mill shipments in steel products are becoming increasingly difficult to obtain. Bar iron is quoted at 1.60c; steel bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets at 75 and 7½ percent off. We quote black sheets, No. 27, at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.20c; No. 14, 2.10c; No. 12, 2.05c; No. 10, 2c Tank plates are firm and sell out of store at 2c for ¼-in. and 2.10c for 3-16, No. 8 and No. 10. Beams and channels are quoted at 2c from stock, and angles at 2c to 2.05c for base sizes.

In merchant pipe the leading interest advanced quotation one-half on April 20 and on boiler tubes an advance of 2 points was made. It is believed that independents will follow the schedule of the leading interest as demand is sufficient to warrant adherence to prices. We revise quotations as follows:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ and ¼ inches	65.35	49.35	63.35	47.35
⅜ and ½ inches	69.35	57.35	67.35	55.35
¾ to 6 inches	73.35	63.35	75.85	61.85
7 to 12 inches	68.35	53.35	66.85	51.35

Old Material.—The market is easy in tone and it is intimated that dealers are offering to book orders for cast scrap at prices below quotations. Demand continues unimportant. We quote f. o. b., Cincinnati:

Old No. 1 railroad wrought, net tons	$16 50 to 17 00
Cast machine and foundry, net tons	14 00 to 14 50
Old iron rails, gross tons	21 50 to 22 00
Old steel rails, gross tons	15 50 to 16 00
Old short lengths, gross tons	14 50 to 15 00
Old iron axles, net tons	21 00 to 22 00
Stove plate, net tons	10 00 to 10 50
Wrought turnings, net tons	11 50 to 12 00
Cast borings, net tons	9 00 to 9 50
Car wheels, net tons	16 00 to 17 00

Coke.—The market is easy with a declining tendency with foundry coke quoted at $2.75 and furnace coke $2 on contracts f. o. b. Connellsville. Foundry coke from other districts is available at $2.60 per ton f. o. b. ovens and the market is considered weak at this quotation.

PHILADELPHIA.

April 25.

Developments of the past week have all tended to indicate the underlying strength of the present market. After months of active buyers of pig iron there has come a marked falling off in the volume of orders, but this is looked upon as only natural, and prices have not weakened. Steel men here place little credence in Pittsburg reports of the probability of imports of finished steel, and at present prices do not see how such an importation could be made, except as a temporary expedient to help out on an order of pressing emergency. The Pennsylvania Steel Co., which recently bought 30,000 tons of English and Welsh pig iron, denies current reports that it is after 30,000 tons more for its export rail trade. Its sales of rails for South America amount to about 60,000 tons. A bright feature of the situation is that Philadelphia approaches May Day without a single labor trouble in view,

and with the prospect of little annoyance from that source during the present year. A local incident of interest is the receipt by the Baldwin Locomotive Works of an order from New South Wales for 200 locomotives at $19,000 per engine.

Pig Iron.—The market is quiet, so far as large orders are concerned. There is a steady tonnage from small buyers, and this is expected to continue. Low phosphorus iron, the consumption of which in this market is not large, continues scarce, with an advancing tendency in sales being made as high as $21.50. Now that the shipments of Lake Superior ores have begun some furnace men are looking forward to more or less congestion on the railroads, and look upon this as a fact or in sustaining prices. We quote as follows:

No. 1X Foundry	$18 25 to 18 50
No. 2X Foundry	17 75 to 18 25
No. 2 Plain	17 25 to 17 50
Standard Gray Forge	16 00 to 16 50
Ordinary Gray Forge	15 75 to 16 00
Basic	16 75 to 17 00
Low phosphorus	21 00 to 21 50

Finished Material.—With all the mills crowded with orders, prices are hardening, and premiums are the rule for anything like early delivery. There is an especially urgent demand for plates. Boiler tubes have been advanced a point, and in every quarter the consumption of material is reported as being enormous. Prices may be quoted as follows: Beams, channels and angles, according to specifications, 1.73½c to 1.85c; refined iron bars, 1.73½c to 1.80c; steel bars, 1.63½c to 1.70c; plates, 1.73½c to 1.80c.

Old Material.—The mill men seem to hold the whip hand in the scrap market, and under their refusal to buy prices in several lines have weakened. Holders of scrap have been rather surprised that the mills have been able to hold off so long, having evidently under-rated the supplies and material on hand, but still think that the general situation is on their side. In the meantime the mills are able to supply their wants at about the following prices:

Old steel rails	$18 00 to 18 50
No. 1 steel scrap	17 50 to 17 75
Old steel axles	22 50 to 23 00
Old iron axles	25 75 to 26 75
Old iron rails	23 50 to 24 50
Old car wheels	17 00 to 17 50
Choice scrap, R. R. No. 1 wrought	22 00 to 22 50
No. 1 yard scrap	20 00 to 20 50
Machinery scrap	16 00 to 16 50
Low phosphorus scrap	21 50 to 22 00
Wrought iron pipe	16 00 to 16 50
No. 1 forge fire scrap	16 25 to 16 75
No. 2 forge fire scrap, ordinary	12 50 to 13 00
Wrought turnings	14 50 to 15 00
Axle turnings, heavy	15 00 to 16 00
Cast borings	11 00 to 11 50
Stove plates	12 50 to 13 00

NEW YORK.

OFFICE OF The Iron Trade Review,
ROOM 1315, NO. 150 NASSAU ST., April 25.

Pig Iron.—During the week local market ruled quiet, with prices receding at least 25 cents per ton as compared with a week ago. There was a little spurt in the market yesterday, due to the closing of several transactions that had been hanging fire for weeks, among them a sale of 1,400 tons of foundry to the leading pump interests, and 2,000 tons of Virginia basic to a Central West steel castings company. From the standpoint of new business, however, the market has borne a decidedly quiet aspect, which has been much more noticeable than for the week previous. Buyers seem to be well provided for at present, and melters have found them so indifferent to purchasing, that inducements in the form of a 25 or 50 cent reduction, per ton have been offered them, with few orders resulting. At Eastern Pennsylvania furnaces $16.50 is the maximum price for No. 2 foundry, with $16.25 the basis of actual sales. In Southern iron there is no company asking more than $13.50 for No. 2 foundry, Birmingham, but it would not require much effort to place orders at $13.25, at any rate for round lots. At the prices we quote, all furnaces, both North and South, will take orders for delivery the remainder of the year. It is their willingness—one might say eagerness—to do this, that has greatly strengthened buyers in the belief that it is to their advantage to await developments. Even among sellers the impression prevails that the market is likely to be dull for a month yet, when they expect a buying movement to set in. New York quotations at tide-water as follows: Northern No. 1 foundry, $17.75 to $18; No. 2 foundry, $17.50 to $17.75; No. 2 plain, $17.00 to $17.25; Southern No. 1 foundry, $17.50 to $17.75; No. 2 foundry, $17.00 to $17.25; No. 3 foundry, $16.50 to $16.75; No. 4 foundry, $16.25 to $16.50.

Foundry pig iron warrants follow:

	Bid.	Asked.
April	$16 40	$16 50
May	16 25	16 50
June	16 25	16 50
July	16 25	16 50
October	16 25	16 75
February	16 25	16 75

Finished Iron and Steel.—The structural material market continues to be active, with the orders running mostly to small lots, but making up an excellent tonnage. The most important contract of the week was for 8,000 tons for the Naugatuck bridge, which the New York, New Haven, and Hartford road will build. It went to the American Bridge Co which has orders on its books now aggregating 400,000 tons. Plates continue to hold their strong position, and we know of authentic sales made during the week at $4 per ton premium. Bars are without feature, while sheets are quiet. We quote New York prices at tidewater. Angles, 3 to 6 in. x ¼ in. and heavier, 1.74½c; beams, 3 to 15 in., 1.74½c; channels, 3 to 15 in., 1.74½c; beams, 18, 20 and 24 in., 1.84½c; tees, 3 x ¼ in. and heavier, 1.79½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine and ordinary firebox, 1.94½c; refined iron bars, 1.64½c; soft steel bars, 1.64½c to 1.67c; sheets, in carload lots, New York, No. 28, black, 2.50c to 2.55c; galvanized, 3.60c to 3.70c.

Old Material.—The general market was active during the week, with prices for many items declining from 25 cents to $1 per ton as compared with last week. Even heavy steel scrap, which was the leader in the recent upward movement, and which always remained firm, sold off from 50c to 75c per ton. The weakness of the market is attributed to heavy offerings, and the recession in pig iron prices. Our inside quotations reflect more truthfully the actual basis of sales. Approximate prices f. o. b. New York follow:

Old iron rails	$20 00 to 22 00
Old steel rails, long lengths	16 00 to 17 00
Old steel rails, short pieces	15 50 to 16 50
Relaying rails	21 00 to 22 00
Old car wheels	16 00 to 16 50
Old iron car axles	21 75 to 22 75
Old steel car axles	19 00 to 19 75
Heavy melting steel scrap	15 50 to 15 75
No. 1 railroad wrought scrap	19 50 to 20 50
Iron track scrap	17 00 to 18 50
Wrought pipe	14 50 to 15 25
Ordinary light iron	11 00 to 12 00
Cast borings	8 00 to 8 50
Wrought turnings	12 50 to 13 50
No. 1 machinery cast	
Stove plate	12 50 to 13 00

BIRMINGHAM.

April 24.

Though the Alabama pig iron market has not shown any special features in the past fortnight, it is stated by manufacturers that the sales being made are equal to the production. Many orders are being booked for the latter part of the third quarter of the year, with some deliveries being stipulated for the last quarter. Three furnaces have already been blown in this month. The Tennessee Coal, Iron & Railroad Co. blew in one furnace at Bessemer, the Republic Iron & Steel Co. one at Thomas, and the Alabama Steel & Wire Co. a furnace at Gadsden. The Tennessee company's No. 6 furnace at Ensley is expected to go in this week. Another furnace at Bessemer is ready for the torch, while the little Williamson furnace in the city is being made ready. The last named belongs to the Dimmick Pipe Co., of North Birmingham. Within another two weeks the new furnace of the

Woodward Iron Co. at Woodward will be ready for the torch. This company intends blowing out one of its old furnaces for necessary repairs. Notwithstanding the increase in the production, the Alabama manufacturers are not concerned as to the maintenance of a full demand through the balance of the year, warranting the steady production of iron. Quotations are firm with No. 2 foundry selling at $13.50 We quote No. 1 iron at $14, No. 3 at $13, No. 4 at $12.50 and gray forge at $12. There is no accumulation of iron in Alabama. No sales of any great proportions were made during the past week or two, though a number of inquiries on hand would indicate that some of the larger consumers are still in need of iron and that some very healthy orders are likely to be placed in the Southern territory shortly.

The coal and coke situation in Alabama is almost what it was last year before the strike of the union miners began. The furnaces are getting better shipments than for more than six months. The railroads handling coke from West Virginia and other coal fields have advanced freights from 25 to 50 cents. Quite an amount of coke is still brought in, but if the improvement locally continues as in the last four weeks there will hardly be any need of buying outside of the district.

Consumption of pig iron in Southern territory holds up well. Cast iron pipe works, machinery foundries, stove foundries and other industries are all doing well, with plenty of orders in hand and others in sight, especially the cast iron pipe makers.

The certificate of incorporation of the Sheffield Cast Iron Pipe & Foundry Co. has been filed. The company is capitalized at $500,000, and the incorporators are J. W. Worthington, vice president of the Sheffield company; S. B. McTyre and Snowdan Mcgaughy, all of Sheffield. W. N. Parsons, of New York, is treasurer of the company with J. G. Aderton, also of New York, auditor. Mr. Worthington is president. The company has already started to erect a large pipe foundry at Sheffield, which will give employment to 200 hands at least.

The report of the Alabama Car Service Association for the month of March, issued a few days since, shows that the railroads belonging to the association handled over 68,000 cars, a record greater than for any one month in the past 12 months. The greater portion of the traffic is handled in the Birmingham district.

Much interest is taken in the approaching meeting of the Tennessee Coal, Iron & Railroad Co., in view of the belief that the negotiations looking to a merger of coal and iron interests in this State are not all off yet.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., April 25.

Pig Tin.—During the week the market was quiet, and prices sold off. Consumers are only buying in limited quantities, feeling that lower prices are certain to come. The London market has been active, with prices lower than a week ago. Today's closings follow: Spot and April, 30.35c to 30.50c; May, 30.00c to 30.25c; June, 29.50c to 30c; July, 29.25c to 29.75c. London's closings today follow: Spot, £139 10s; futures, £134 10s. Arrivals at Atlantic ports for the month to date amount to 2,880 tons, with 2,479 tons afloat.

Copper.—All grades are ⅛c lower than a week ago, and it begins to look as if the large producers are taking cognizance of actual trade conditions, which could stand considerable improvement. Export buying is the market's only redeeming feature. London during the week was quiet, receding slightly. Today's closings follow: Lake and electrolytic, 15.00c to 15.25c; casting, 14¾c to 15c. London's closings today follow: Spot, £66, 5s; futures, £66, 8s 9d. Exports for the month to date aggregate 15,663 tons.

Lead.—Locally is quiet and unchanged. St. Louis is firm at 4.50c. London declined to £12, 12s 6d.

Spelter.—The market has been quiet and lower spot and April offered at 5.90c, and May 5¾c to 5⅞c. St. Louis is firm at 5.75c to 5.80c. London remains at £24.

Antimony.—All grades are firm, Cookson's selling at 8½c to 8⅝c, Hallett's at 8¼c to 8½c, and other brands at 7½c to 8.12c.

Quicksilver.—We quote $38 per flask of 75 lb. lots of 100 flasks. London £7 7s 6d.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, April 25.

The light buying of the past two weeks growing out of the high prices asked by local dealers has softened the market. Copper has declined a fraction of a cent, Lake, in carloads being quoted 15¼c, and in less than carload lots, 15½c. Casting copper is sympathetically weaker, being quoted 15⅛c for carloads, and 15¼c for less than carload lots. Spelter is quiet at 6c for carload lots, and 6¼c for lesser quantities. Sheet zinc is in fair demand at 7¼c for carload lots of 600lb. casks, and 7½c for less than carload lots. Pig tin, 31¼c for carload lots, and 31½c for less than carload lots. Pig lead 4.45c for 50-ton lots, and 4.50c for carload lots, and 4.55c for lesser quantities. Antimony, both Cookson's and Hallett's, 9¼c.

Old metals are weaker. We quote: Copper wire, 13½c; heavy copper, 13c; light copper, 12c. Red brass, 11¾; red brass borings, 10c. Yellow brass, 8½c; yellow brass borings, 7¼c. Pipe lead, 4c; tea lead, 3.60c; zinc, 4.25c.

Tennessee Coal, Iron & Railroad Co.

Half of the excavating for the open-hearth furnace which is to be added to the plant of the Tennessee Coal, Iron & R. R. Co. at Ensley, Ala., has been completed. Additional soaking pits are being added, and a more powerful engine will be placed at the rail mill. All of the rails that the mill can roll during the year 1905 have been sold, and some have been sold for delivery in 1906. The production at the Ensley plant is growing larger every month. The records for the present month are keeping up with the production for the same period of last month, and it is estimated that if there should be no accident before May 1 the output of March, which aggregated 23,053 tons, will be duplicated if not improved.

Semi-Centennial of the J. W. Paxson Co.

The month of May will bring the 50th anniversary of the establishment of the well-known house now doing business as J. W. Paxson Co., of Philadelphia, manufacturer of foundry facings, supplies and equipment and mining and dealing in foundry sands. The company manufactures most of the foundry supplies and equipment it handles and ships molding sand for iron, brass and steel castings throughout all the Atlantic Coast States. For deliveries along the coast the company runs its own line of ocean barges.

J. W. Paxson started the business in 1855. He is now 85 years of age, and while he visits the offices occasionally he is not active. J. K. Bougher, now the president of the company, joined Mr. Paxson in 1857 when the firm name was J. W. Paxson & Co. Previous to that time Mr. Bougher had been captain of a Delaware river tug boat. Howard Evans, who is known throughout the country both in his connection with the firm and for his activity in behalf of the foundrymen's association movement, joined the Paxson interests in 1892, which was also the first year of J. S. Hibbs's connection with the company. The officers are the following: J. K. Bougher, president and general manager; Howard Evans, vice president; H. M. Bougher, secretary and treasurer; J. S. Hibbs, assistant general manager; S. C. Bougher, purchasing agent.

PERSONAL.

Henry Bond has resigned from the chairmanship of the operating board of the American Radiator Co., owing to ill health. William H. Hill, formerly secretary of the board, has been appointed to the chairmanship to fill the position vacated by Mr. Bond. A. A. Landon, formerly manager of the Pierce plant of the American Radiator Co. at Buffalo, has been appointed to fill the position of superintendent of plants, with headquarters at the gneral offices of the company in Chicago.

Frederick W. Sivyer, president of the Northwestern Malleable Iron Co., Milwaukee, Wis., accompanied by his wife and several friends, sailed for Europe March 28th on the steamer Slavonia. The party will be gone several weeks, during which they will make a tour of the continent.

John G. Parke, chief engineer of the Donora, Pa., plant of the Carnegie Steel Co., Pittsburg, has resigned, and has accepted the position of chief engineer of the Passaic Steel Co., Passaic, N. J.

T. C. Stevenson has been appointed manager of the Pittsburg district mills of the American Sheet & Tin Plate Co., to succeed I. R. Phillips, resigned. George C. Stone, general superintendent of the Star tin plate works of this company at Pittsburg, has been appointed superintendent of the Monongahela works, Pittsburg, and James Hunter has been appointed superintendent of the Star plant.

President W. E. Corey, of the United States Steel Corporation, will sail for Europe in the early part of May.

Chas. M. Schwab has been in St. Petersburg several days this week and has discussed with Grand Duke Alexis, high admiral and other high officials, Russia's naval program, which is said to involve an expenditure of $350,000,000 during a period of ten years.

Charles Ducas, M. E., formerly editor of the *Railroad Gazette*, has become associated with Ray D. Lillibridge in the business of technical publicity, at 170 Broadway, New York.

The Treasury Department has decided to take to the supreme court on a writ of certiorari the case of the United States vs. the Crucible Steel Co., of America, which was recently decided adversely to the government by the circuit court of appeals. The case involves an invoice of cold rolled steel, which the government claimed had been brightened or polished. The importers protested against this classification, which meant an extra duty of one cent per pound, and the court sustained the appeal. A new case will be brought, but duties will be refunded in the Crucible company case.

F. H. Jones, formerly manager of the air compressor department of the International Steam Pump Co., has been made general sales manager and will take up the organization of a comprehensive general sales department, similar to those recently organized by several of the large corporations. The International Steam Pump Co. controls Henry R. Worthington, with extensive new works at Harrison, N. J.; the Geo. F. Blake Manufacturing Co. and the Knowles Steam Pump Works, located at East Cambridge, Mass.; the Laidlaw-Dunn-Gordon Co., whose plant is at Cincinnati; the Snow Steam Pump Works and the Holly Manufacturing Co., both of Buffalo, N. Y.; the Deane Steam Pump Co., of Holyoke, Mass., and the Clayton Air Compressor Works, of Brooklyn, N. Y. Mr. Jones has been for five years manager of the air compressor and power pump departments and in charge of special government work for his company. He is a graduate of Cornell University, class of 1880, and since leaving school has been engaged in the manufacturing and selling of pumping apparatus.

Jos. Reuleaux, for many years engineer with Alex Laughlin & Co., Pittsburg, has severed his connection with that firm. Mr. Reuleaux is the inventor of the well known continuous heating furnace and other successful designs. His present business address is 704 First National Bank Bldg., Pittsburg. He sailed for Europe on April 22 and will make his headquarters at Liège, Belgium, during the international exposition.

F. G. Tollman, who resigned recently as manager of the Brown Hoisting Machinery Co., Cleveland, will remove to Wilmington, Del., to take charge of the purchasing department of the E. I. DuPont Co., powder manufacturer.

Loring Coes, of Worcester, Mass., a pioneer in monkey wrench manufacture, celebrated his 93d birthday on Saturday, April 22. Mr. Coes is still active in his business and attends to it daily. In all his experience he has not had a labor trouble. The firm of Loring Coes & Co. has developed a number of specialties in addition to that on which the business was founded.

International Association for Testing Materials.

Announcement is made from Vienna on behalf of the council of the International Association for Testing Materials, that the proposal to hold the fourth congress of the association at St. Petersburg this year has been abandoned. It was decided to accept an invitation to go instead to Brussels, but difficulties subsequently arose, and the council now announces that the fourth congress will be held at Brussels in 1906, while the expectation is that the fifth congress will convene at St. Petersburg in 1907.

Eagle Works to be Dismantled.

The Republic Iron & Steel Co. is planning to dismantle its Eagle Works at Ironton, O. The plant was established in 1852 and has been enlarged several times. It has 14 single and two double puddling furnaces, three gas furnaces for bar and guide mills, one scrap furnace and three trains of rolls, one 18-in. muck, one 3-high 16-in. bar and one 9-in. guide. The product is bars and light rails and the annual capacity 30,000 tons. It is understood that the Norfolk & Western Railway Co. holds an option on the site.

Struthers Coal & Coke Co.

The Struthers Coal & Coke Co., Cleveland, has been organized by interests connected with the Struthers Furnace Co. to own and develop the coking coal property recently purchased. The company has 242 acres in the Connellsville region near New Salem, Pa., and will let contracts in a few days for the building of 160 ovens. The contracts for sinking shafts have been awarded. Fifty houses for employes will be built. The 160 ovens will furnish coke for the Struthers furnace, but it is expected that more ovens will be built later.

Proposed Steel Plant Additions.

The Passaic Steel Co., Paterson, N. J., and the Maryland Steel Co., Sparrow's Point, Md., are considering the erection of large additions to their plants. The additions to be made at the Passaic works have not yet been definitely decided upon, but in all probability will cost close to $2,000,000. Many plans are under consideration and in all probability a definite decision will be reached in a few weeks. No announcement has yet been made of the nature of the improvements and additions to be made at the plant of the Maryland Steel Co., but in all probability they will consist of additions to the rail mill and the erection of another blast furnace.

The Seamless Tube Co. of America, Pittsburg, this week rolled its first experimental tubes by the Briede process at its new mill, Monessen, Pa. The mill will have an output of 100 tons daily.

Announcement is made by the reorganization committee of the Herring-Hall-Marvin Safe Co. that more than 84 percent of the total stock outstanding of the company has assented to the plan of reorganization, and that the same has been declared effective.

THE IRON TRADE REVIEW

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APRIL 27, 1905.

RELATIVE USE OF SCRAP AND PIG IRON.

Production of basic open-hearth steel ingots in the United States increased without a halt from less than a million tons in 1896 to more than 5,000,000 tons in 1904. That year was a very dull year in the iron trade, while at the present time a state of intense activity prevails. The amount of scrap coming out from year to year has increased very much less rapidly. As scrap was at the outset the very foundation material of the basic open-hearth steed industry, no great amount of skill in forecasting the future was displayed in the oft repeated predictions that scrap for the basic steel furnace was bound to become a very scarce article.

These prophecies are evidently being fulfilled at the present time, but not in the spectacular way that may have been anticipated by some, particularly by scrap dealers. Reports from all over the country characterize the scrap market as dull, lifeless, declining and even surfeited. On the surface there is no scarcity. Dealers have more material than they can dispose of, and are accepting slightly lower prices than they would a month ago.

The surface view does not tell the story. The difficulty in disposing of scrap is simply a difficulty in disposing of it at predetermined prices. Down beneath the surface can be seen an enormous demand for scrap, but at a price somewhat lower than holders are willing to accept. Dealers are fond of citing the fact that heavy melting stock is worth ton for ton as much as pig iron, or when the largest output per furnace is sought, as much as 15 percent more than pig iron. What is pig iron worth? To the leading interest, which is doubtless making more than 300,000 tons of basic open-hearth steel ingots per month, it is not worth the current market price, or the Steel Corporation's purchases of pig iron would not be so trifling and its scrap purchases a mere bagatelle.

The United States Steel Corporation is well provided with ores, which have been rather generously capitalized. Other steel interests are also provided with ores, and all are quite naturally anxious to turn their ores into cash For what other purpose are they held? Current ore prices reflect a fair profit in the mining, and on purchased ores current pig iron prices reflect a very fair profit in the smelting It must be a very cogent reason indeed that will induce these interests to close their ore mines, blow out their blast furnaces, and use scrap in their open-hearth furnaces because relative to the figment of current market prices scrap is as cheap as pig iron. The real value of pig iron to those who produce the great bulk of the basic open-hearth steel is what it costs them to make the pig iron, because they do make it. The amount of such steel made from purchased pig iron is relatively very small.

There is, then, an almost unlimited demand for scrap, at a price, but not at a price relative to what may happen to be the current market for pig iron, and always providing there is the demand for the finished steel product, and the rolling mills are waiting to roll the ingots into the finished forms.

Another influence is of importance. Every steel mill produces scrap in the form of rejected ingots or portions of ingots, casting pit scrap, crop ends, etc. This scrap is an endless chain. It comes out of the open-hearth furnace and goes back into it. Nearly all of it, of course, passes through the ingot form and contributes over and over again to the ingot production of the country as reported in statistics. In times of extreme activity the proportion of scrap thus produced is not decreased, but increased. Both the rush for tonnage and the desire to maintain quality contribute to the production of scrap in this way. Whether through mindfulness of the scrap situation or not, it is a fact that the production of scrap in steel mills, relative to total steel production, has increased in recent years, and this scrap now constitutes the chief portion of the scrap used in the largest operations.

No scrap, however it originates, within reasonable distance of centers of consumption, will be wasted, but it will be taken only at the proper price to be fixed by the influences just noted. Scrap will be even more a speculative commodity than it has recently become; it will be hoarded by the far-sighted and distributed at the proper time, just as pig iron would be if blast furnaces were wound up to run irrespective of the will of their owners.

A consequence of this development is obvious. Pig iron production is at an unprecedented rate, and being more easily studied has been taken as the unchangeable yardstick of the iron and steel business as a whole. It is not. If less scrap is used in open-hearth steel manufacture, more pig iron is used, and steel ingot production has not increased as greatly as pig iron production. Again, with more of the ingot tonnage going into scrap, and forming heavier links in the end-

less chain through the furnace, the quantity of actual finished steel manufactured is a less percentage of the ingot production than it was. These considerations furnish some small part at least of an answer to the oft repeated query: "Where is all the iron going?"

UNPRECEDENTED TIN PLATE PRODUCTION.

The tin plate trade is naturally attracting much attention at present. There was ground enough for astonishment at the movement late last year which resulted in substantially every regularly operative tin mill in the country being put into operation, considering that never before have all the regularly operative mills been running at one time; but there is now further ground for surprise in the remarkable records of production which are being made by both the leading interest and the independents.

There was a time last October when the leading interest had a bare third of its 242 tin mills in operation; during September, October, and the first half of November it operated an average of about 125 mills. While during the whole of this time the independents were operating more than three-fourths of their mills, the grand total of tin mills in operation averaged only about 185 from the first of September to the middle of November. Then began a remarkable movement, by which the leading interest proposed to start every one of its idle mills. This was accomplished before the end of December, every one of its plants being then in operation, small portions of two or three plants being idle from different causes. For four months since then not a single one of the 242 tin mills has been idle, except for transient causes, such as lack of steel, breakage, shortage of gas, and flood. The average operation has been better than 95 percent, and on several occasions the percentage has been 100.

While even last fall the independents were operating the bulk of their plants, production was not being pushed. They have since started nearly every idle mill and have been making every effort towards maximum production. Since the first of the year they have operated an average of fully 60 mills, against 72, as we summarize the total number of regularly operated independent mills. Thus it is safe to assert that for nearly four months there have been operated an average of 290 tin mills in the United States. Never before have so many tin mills been operated for a single month, and it is extremely doubtful if this average was ever touched, even for a single day. The closest approach was made in the second quarter of 1903.

The bare number of tin mills in operation is in itself a remarkable record, but that is not all. The leading interest has shown monthly average outputs per mill that have never before been reached, resulting in enormous totals, its production during March having been about 55,000 gross tons, with prospects of a slight increase this month. The independents are doing as well in the matter of output; indeed, the only regularly operated tin mill which has been idle in the past month has been closed by the management, according to its own statement, solely because the men would not make outputs which were being made at other mills in the district. One independent mill made in March what is probably a world's record, producing in the month 267 gross tons of black plate per mill, the average gauge being half way between 30 and 31. Other independent mills have done very well also, and it is safe to estimate that, with the leading interest operating 242 mills and the independents 65 mills, barring occasional accidents, black plate is being produced at the rate of 70,000 gross tons per month. A comparatively small portion of this tin mill product is not coated, going into enameling stock, etc., but Mr. Swank's statistics show a production of such black plate of 365,743 gross tons in 1902, and 490,652 gross tons in 1903. The production in 1904 was probably not more than slightly in excess of the 1903 production, so that at 70,000 tons per month the United States is now making black plate at from 65 to 70 percent in excess of its best previous rate for a year.

There is still another phase of this tin plate story. The term we have used—"regularly operative tin mills"— does not include several plants which at one time have made small quantities of tin plate, or have never been entirely completed. These mills are being added to the regularly operative class. The chief of these dormant mill have been at Morgantown, W. Va., Clarksburg, W. Va., Marietta, O., and Greencastle, Ind., having a probable capacity, on the basis of the actual output of the present operative mills, of about 70,000 gross tons annually. The Morgantown mills recently bought by an attorney, although unidentified, are believed to intend operating independently. The Clarksburg mill was recently bought by a retired district manager of the leading interest, who will at once move it and place it in operation. The Greencastle mill was bought by other independent interests and will be started at once, in its present location. The Marietta plant has been the subject of much negotiation and will presumably find itself in the operative class shortly.

Of course it can be urged that the present activity will not be maintained throughout the year. Possibly it will not be, but there is little evidence of stocking in tin plate outside of can sizes by certain interests. The general jobbing tin plate which is being made appears to be absorbed as fast as made, and this demand runs with considerable steadiness through the year. With the worst that can happen the production of tin plate this year will greatly exceed all previous records, with a total of anywhere between 600,000 and 800,000 gross tons. In 1897, the first year in which the mills supplied substantially all the domestic demand, the production was only 256,598 gross tons. At that time there were heavy imports to supply the "rebate" trade. Later, efforts were made to capture this trade, which is substantially duty-free, on account of 99 percent of the duty being refunded on the export of articles made from the tin plate, but interest has almost been lost in this business. The leading producer is making scarcely any effort to take orders in rebate plates, allowing the Welsh manufacturers full swing in this branch. The imports of tin plate in the eight months ended Feb. 28 last were at the rate of 164,677,741 pounds annually. Not since 1894 has drawback been allowed on as much as 140,000,000 pounds in any fiscal year, so that it is obvious that no considerable part of the present domestic output can be charged to the rebate trade.

A RECORD IN RAIL MILL CONSTRUCTION.

(Special Telegram.)

PITTSBURG, April 26.—The rail mill of the Republic Iron & Steel Co. at Youngstown, O., which was successfully placed in operation on Saturday, April 22, was built in record time. The contracts for the entire mill, including engineering and designing and consisting of roll trains, tables, manipulators and transfers, as well as the runout and saw tables, hot saws, hot bed tables and hot beds, were placed with the United Engineering & Foundry Co., Pittsburg, on Nov. 19, 1904. The first rail was put through the rolls shortly before 6 p. m. Saturday and was an 80-lb. standard section. The conveyors, straightening presses for the rail finishing department, bar piler and sheet bar hot bed were also furnished by the United Engineering & Foundry Co. The mill is designed to roll both standard section rails from 50 to 100-lb. sections and sheet bars, and will have a daily capacity of 1,800 tons of either product.

The work of installing the machinery was started about the time the contract was let, excavating and foundation work being done by the Republic Iron & Steel Co. and completed in time to set up the machinery as fast as received. Considering that this work was done in the winter time and that the excavating included the removing of a number of old foundations, it is remarkable that the Republic Iron & Steel Co. concluded their work so promptly, and great credit is due to General Manager Hart and his organization.

The contract for the engine for driving this mill, which is a 54 x 60-in. Corliss, was placed with the Filer & Stowell Co., of Milwaukee, who promised to deliver it in ninety days. As a matter of fact the engine was delivered on board cars in ten weeks from the receipt of the contract, although the makers had to design and make the patterns for the engine after the order was received. Great efforts were put forth by all concerned to have the mill ready to operate by May 1, which intention was more than carried out, as the first rail was rolled nine days before that time. Considering that this mill was an entirely new proposition, the fact that it was designed, constructed, installed and put in operation in five months and three days, constitutes a record-breaking performance, jointly to the credit of the United Engineering & Foundry Co. and the management of the Republic Iron & Steel Co. The finishing department has not been fully completed and the mill will not operate on rails for the trade for about a month.

U. S. Steel Corporation Earnings.

At the regular quarterly meeting of the United States Steel Corporation directors April 25, the usual quarterly dividend of 1¾ percent was declared on preferred stock. It was announced that unfilled orders on the books April 1 amounted to 5,597,560 tons, against 4,696,203 tons on January 1, 1905. The report shows a surplus after all charges and the preferred for the March quarter of $2,253,407, against a deficit of $1,620,774 in the same period last year. Net earnings for the quarter ended March 31, 1905, were $23,025,858, against $21,458,734 for the preceding quarter. March quarter earnings for the corporation since it was organized compare as follows:

1905	$23,027,000
1904	13,445,232
1903	25,068,707
1902	26,715,457

All of the present officers of the corporation were unanimously re-elected for the ensuing year. The only other business to come before the meeting was the election of Robert Bacon as a member of the finance committee to succeed himself, his term having expired.

The Pennsylvania Railroad Co. has placed its annual engine order with its locomotive plant located at Altoona, Pa., which calls for the construction of 180 locomotives during the next 12 months.

UNITED STATES STEEL & TIN PLATE WORKS.

A plan for the reorganization of the United States Sheet & Tin Plate Co. is now being formulated and the court will be petitioned shortly for the discharge of the trustee placed in charge of the property. The reorganized company will have a capital of $750,000 and bonds to the amount of $300,000 bearing 6 percent interest will be issued. The headquarters of the company will be established either at Columbus, O., or Pittsburg. It will require $150,000 to take the company out of the hands of the court and this has been provided. The following properties will be controlled by this company: Marietta Sheet & Tin Plate Co., Marietta, O.; Tuscora Steel Co., Newcomerstown, O.; Cambridge-Byesville Steel Co., Byesville, O.; tin dipping plant of the American Tin & Terne Plate Co., Philadelphia; Tucker Mfg. Co., Newark, O.; Byesville Coal Co., Byesville, O., and the Bear Run Gas Co., Marietta, O. The officers of the company will be W. S. Ravenscroft, Pittsburg, president; M. F. Straus, Philadelphia, vice president; L. C. Taylor, Cambridge, O., secretary. The officers together with J. R. Jackson, H. B. Stewart, M. S. Kline, D. A. Garden, J. H. Eller and J. E. Straus will compose the board of directors. D. A. Gardan will be general manager.

The Ralston Car Co., Chicago, has purchased the plant of the Rarig Engineering Co., Columbus, O., and will begin at once to remodel the plant for the manufacture of steel cars of every description. The buildings will be especially equipped to produce the steel car known as the Ralston general service car, in addition to which will also be produced the Ralston drop bottom gondola car.

The Business Men's Association and the Board of Trade at Findlay, O., have decided to accept the proposition of former employes of the Ohio Rolling Mill Co., of that city, for the starting of the plant. It is proposed to organize the company with a capital of $75,000 of which $30,000 is to be preferred stock to be sold for cash to start and equip the plant.

The plant of the Union Machine & Boiler Co., Cleveland, was slightly damaged by fire April 22. Newspaper reports of the fire were grossly exaggerated. The operation of the plant will not be interrupted.

The Cincinnati Milling Machine Co. reports constantly increasing business which has compelled it to plan for an addition aggregating 20,000 sq. ft. of floor space. This will consist of two buildings, one to be used as a warehouse for rough stock, and the other to be a one-story steel construction building with wired glass roof and concrete floor. This building will be used for heavy machine work and will be well equipped by cranes. The machine tools for the new shop have already been purchased. The company is also arranging for a new wash-room with latest devices for convenience and for proper sanitary conditions.

Delegates to the first annual convention of the Ohio Millers' State Association, at Springfield, O., last week, were entertained at an informal smoker given on the evening of April 21 at the Lagonda Club, by the Foss Mfg. Co. and the James Leffel & Co.

Receiver Charles O. Kerstetter has sold the plant and business of the Summit City Machine Co., Akron, O., to Frank Wybel, who will operate it. The sale was confirmed by Common Pleas Court. The price paid was $4,000. The company went into the hands of the receiver about four weeks ago on a suit of George Wybel.

The blooming mill of the Ohio works of the Carnegie Steel Co., Youngstown, O., during a 12-hour turn last week rolled 604 ingots, breaking the best previous record of 583.

The Labor Situation.

WAGES ADVANCED IN PITTSBURG.

The members of the Manufacturers' Association of Pittsburg, at a meeting held Friday, April 21, decided to advance the wages of the machinists, blacksmiths, molders and coremakers 10 percent and the patternmakers 25 cents a day, effective June 1. The wages of other craftsmen in the employ of members of the association will also receive corresponding increases in wages. The men employed in more than thirty foundries and machine shops in the Pittsburg district are affected by this advance. No union agreements have been entered into with the molders and machinists since the expiration of the last agreement last July, and since the patternmakers' strike the latter organization has not been recognized. However, the minimum for molders in all the foundries of the association continues at $3 a day, while the machinists receive $2.70. The agreement with the patternmakers before the strike called for the payment of 42 cents an hour, but no such uniform scale exists at present. When this advance becomes effective, the molders, machinists and coremakers will receive higher wages than have ever before been paid in the Pittsburg district.

Concerning this advance, William H. McFadden, president of the association, made the following statement:

"Believing that the general improvement which has developed along most all lines of business since the beginning of the present calendar year warrants an increase in wages, and feeling that employes should share with the employers in the general prosperity which naturally follows more active conditions of trade, it was decided at a meeting of the Manufacturers' Association to make voluntary advances affecting all classes of wage earners, whose wages were reduced during the period of depression. While the upward trend of the foundry, machine and metal working business is not as pronounced as it is in the steel and iron producing lines, the following increases will be made in the wages of skilled men employed by members of the Manufacturers' Association, taking effect June 1, 1905. Machinists, blacksmiths, molders and coremakers, 10 percent. Patternmakers will receive a straight advance of 25 cents per day. Other craftsmen will also receive increases.

"As this is from five to six weeks prior to the corresponding date on which reductions became effective last year, the men are given the benefit of increased pay for that length of time. The policy of the Manufacturers' Association, however, is and has been to deal fairly and equitably with those employed by its members, believing this will be the course which will conduce to permanent harmonious relations between employer and employe; and as most all business based upon present rates will have been disposed of by the first of next June, advances will date from that time instead of July 6 and 15, at which time last year reductions were made. The membership of the association has an employing capacity of between five and six thousand skilled workmen, helpers and handymen, embracing all classes of artisans in the machinery and metal working lines, and while business has not revived to the extent anticipated in view of the remarkable stride in the steel and iron industry, the general outlook is promising."

NEW ARBITRATION AGREEMENT.

There was great rejoicing at the Building Trades Club, New York, April 22, when delegates representing about 10,000 employes and 1,000 employers in the building trades congratulated each other on the harmonious relations which will exist during the coming building season. An arbitration agreement has been signed which will bind employers and employes to work in harmony, and it does not seem possible that there will be any strikes or lockouts. The representatives of the labor organizations at the club were as emphatic against the calling of strikes in the future as were the employers. Otto M. Eidlitz, former president of the board of governors of the Building Trades Employers' Association, was chairman of the meeting. James Hatch, business agent of the Upholsterers' Union, was vice chairman. Thirty-two trades were represented, each side having three delegates. A vote to adopt the new arbitration agreement was unanimous, and it goes into effect at once. Under this agreement, the general arbitration board will consist of two representatives from each employers' association and two from each recognized union. Business agents of unions will be permitted to enter all shops and buildings in the course of construction.

STRIKE ON THE MESABI RANGE COLLAPSES.

The strike of miners in the Mesabi collapsed last week. The men were divided in sentiment, a majority favoring returning to work at the employers' terms. A few miners are still idle on acount of the congestion at the docks, due to the late opening of navigation, but all will resume within a few days.

VERDICT AGAINST BOYCOTTERS.

The Gurney Foundry Co., Toronto, has won a decisive victory over Canadian boycotters. In 1892 this company had some trouble with unions in its shop. The consequence was that the unions sent a delegate from Toronto to all the towns and cities in Canada, who circulated the statement that the products of the Gurney company were on the "unfair list." St. Catherine's, a small city, very strongly unionized with some 20 or 30 different unions, became the storm center of the boycott. In that place a special effort was made to destroy the business of the company. Customers were assured that if they did not give up handling the company's product they would be placed on the "unfair list," which meant that no tradesman in the town would deal with them. The labor agitators not only went to the ordinary trade, but to many individuals who were building, and got them to cancel orders for furnaces, and hot water and steam boilers. The Gurney company in 1902 obtained an injunction against the labor unions, restraining them from boycotting. The injunction was granted against the president, secretary and officers of the Trades and Labor Council of St. Catherine's, which council contained members of a majority of the unions. The attorneys for the company made a motion to have these union officers represent the entire unions. The unions objected to this motion but the company's contention was upheld in the courts, which decided that, although unions are not incorporated, they are liable to be sued, and that by serving their officers every union man was held for their actions. Other questions were raised and the injunction was continued until this month, when the matter was set for trial. It seemed almost impossible to get a jury free from bias, but the company's evidence was strong, and the jury granted $1,500 damages against the union. The verdict will be appealed.

BLAST FURNACE WAGES RESTORED.

Effective May 1, the blast furnace workers employed at all the merchant furnaces in the Mahoning and Shenango Valleys, the furnaces of the Republic Iron & Steel Co., and those furnaces of the Carnegie Steel Co. employing top fillers have been advanced about 10 percent, restoring the cut made on January 1, 1904. The advance is effective at 12 furnaces in the Mahoning Valley and at 17 in the Shenango Valley. Top fillers will be advanced from $2 to $2.20 per day; bottom fillers from $1.90 to $2.10; common labor from $1.50 to $1.65, and mechanical men from $2.50 to $2.75 per day.

AMALGAMATED ASSOCIATION CONVENTION.

The annual convention of the Amalgamated Association of Iron and Steel Workers will be held in Detroit, beginning

with May 2. The wage committee will meet at the Hotel Griswold on Friday, April 28, to outline such changes in the scale as are to be presented for consideration. The wage committee is constituted as follows: Boiling—William M. Gibson, Pittsburg; W. E. Eagan, Covington, Ky.; Albert Rock, Hammond, Ind.; Richard Fitzgerald, Greenville, Pa.; P. H. McGowan, Birmingham, Ala.; Thomas Williams, Vincennes, Ind.; Charles J. Monahan, Pittsburg. Finishing—P. J. McArdle, Muncie, Ind.; Joseph Rutledge, New Albany, Ind.; William Jenkins, Anniston, Ala.; John J. Lewis, East St. Louis, Ill.; Samuel Williams and Thomas Fleming, Youngstown, O. Sheet—William Hilton, Martins Ferry, O.; William Boss, Newport, Ky.; Blanford McKay, Indiana Harbor, Ind.; B. S. Sweeney, Pittsburg; George Mace, Muncie, Ind.; Llewellyn Lewis, Martins Ferry, O.; Thomas M. Evans, Youngstown, O. Tin—John Kersey, Granite City, Ill.; Walter Larkin, Martins Ferry, O.; William G. Young, New Castle, Pa.; John Griffiths, Washington, Pa.; Frank Piggott, Elwood, Ind.; Joseph Derwett, Niles, O.; David J. Davis, New Castle, Pa. Eastern Wage—James B. Mincher, New Haven, Conn.; E. Gallagher, Lebanon, Pa.; B. F. Witmer, Columbia, Pa.; John Kline, Lancaster, Pa.; J. E. Conlyn, Baltimore, Md.

METAL TRADES ASSOCIATION NOTES.

At a meeting of the Chicago Metal Trades Association, held on April 14, the subject of making the Chicago Metal Trades Association a branch of the National Metal Trades Association was considered. It was the unanimous opinion that this was a wise action to take and the following was unanimously adopted:

WHEREAS, It is the desire of the members of the Chicago Metal Trades Association to receive the full benefits accruing from co-operative action to the end that our interests may be best protected, and,

WHEREAS, We believe that this protection can and will be best secured by merging the Chicago Metal Trades Association in a branch of the National Metal Trades Association, a body hereby created. therefore be it

Resolved, That the Chicago Metal Trades Association be and hereby is merged in the National Metal Trades Association under the name of the "Chicago Branch of the National Metal Trades Association," as set forth in the proposed plan of merger and affiliation.

Following the meeting most of the local members, not already members of the national association signed their application for membership in the latter. This pledges them to the payment of a membership fee in the national body of $25 and after the details of the merger shall have been perfected, obligates them to dues on the following basis, viz.: 25 cents a month for a full operative—that is, one receiving 20 cents per hour or over, and 12½ cents per month for a half operative, or operative receiving under 20 cents per hour. From these dues the National Metal Trades Association is to be paid by the local treasurer 10 cents a month for each full operative and 5 cents a month for half operative, leaving the balance of the dues for the maintenance of the local association.

The annual meeting of the Worcester Metal Trades Association will be held on April 28. Robert Wuest, secretary of the National Association, will speak on the reorganization and federation of the local and national associations. Chas. E. Hildreth, a member of the administrative council of the N. M. T. A., will speak on the same subject.

LABOR NOTES.

Reports from the different cities where the structural iron workers have unions are that the iron workers generally throughout the country have signed agreements with employers for a year, and that no trouble in the trade is expected. In New York the Housesmiths and Bridgemen's Union was among the first to sign agreements with employers, who were organized as the Iron League.

Forty-two employes of the Berry Foundry & Mfg. Co., St. Joseph Mo., have gone on a strike for higher wages. The company states that it is paying from 10 to 25 cents per day more than is paid by competitors in Omaha, Kansas City and other cities, and that it cannot afford to grant the demands of the strikers.

The coremakers' strike at the Northwestern Malleable Iron Co.'s plant, Milwaukee, has been settled by the strikers returning to work without gaining their demands.

On May 1 the 5,000 employes of the Colorado Fuel & Iron Co. plant in Pueblo, Col., will receive an advance in wages varying from 7 to 20 per cent.

Notices of a readjustment and advance in wages, to take effect May 1, have been posted at the works of the Coatesville Rolling Mill Co., Worth Brothers' Co., and Lukens Iron & Steel Co., of Coatesville, Pa., and at the Parkesburg Iron Works, Parkesburg, Pa. This order will affect 3,000 workmen at Coatesville and 500 at Parkesburg.

Youngstown Iron Sheet and Tube Co.

Published reports of the past week represent that the furnaces of the Brier Hill Iron & Coal Co., the Youngstown Steel Co., Ohio Iron & Steel Co., Stewart Iron Co. and Pickands, Mather & Co. had withdrawn from the general market because of arrangements by which they could supply the Bessemer plant of the Youngstown Iron Sheet & Tube Co. with pig iron. The statement that such contracts have been entered into is without foundation, we are advised. The fact that persons connected with these various furnace companies are also interested in the Youngstown Iron Sheet & Tube Co. is the principal basis for the publication in question. That the companies named will furnish pig iron for the new Bessemer plant is to be expected, and the matter has been under consideration, but no metal will be needed before July of 1906.

The Youngstown Iron, Sheet & Tube Co. has decided to change its name to Youngstown Sheet & Tube Co. The new tube mill built by this company will be finished about May 15, and will make pipe up to 12 inches in diameter.

The Great Lakes Engineering Works, Detroit, has secured the order to overhaul the twelve whalebacks sold by the Pittsburg Steamship Co. some time ago to Benjamin Boutell, of West Bay City., Mich., representing Eastern purchasers. The changes are minor in character, but are intended to make them more serviceable and efficient for ocean service. The whalebacks are bound to Chicago with coal and their final lake cargo will be with grain from that port to Montreal.

The Baldwin Locomotive Works have been awarded the contract for 20 engines for shipment to Australia, where they will be used on the New South Wales Government system. The contract price per locomotive is £3900 (about $19,000), delivered at Sydney, New South Wales, shipment to be made in June. The Baldwin figures were some 15 percent less than those embodied in the lowest British and German bids, and the terms of delivery were considerably more favorable. The Baldwin quotation was also some 25 percent lower than the best Australian price.

At a meeting of the Eastern Bar Iron Manufacturers held in New York last week, present prices were reaffirmed. Nut and bolt manufacturers also reaffirmed prices.

The National Furnace Appliance Co., Columbus, O., has been incorporated by M. S. Seibert, E. S. Baldwin, G. F. Tinkman, L. T. Zimmerman and H. A. Clark. The capital is $25,000.

ORE DOCKS AT UPPER LAKE PORTS.

Through the courtesy of R. Angst, of Duluth, chief engineer of the Duluth & Iron Range Railroad, we are able to present below a complete list of the iron ore docks now operated at Lake Superior ports, with names of operating railroads and data as to capacity and dimensions. The information has been revised to May 1, 1905.

Obituary.

James Seldon Scranton, son of George Scranton, founder of the Lackawanna Iron & Steel Co., died at Scranton, Pa., April 7, aged 64 years. When a young man, he was manager of the Oxford mine, and held that position until 1871, when the mine was sold to the Lackawanna Co. He then went to New York and financed the New Jersey Iron Co., which failed a few years later. He returned to Scranton in 1895 and engaged in the business of selling railroad and mine supplies.

James McQuiston, aged 76, died at his home in Pittsburg on April 11. Mr. McQuiston spent several years with the Atlas Foundry Co., after which, in 1870, he established the Pittsburg Galvanizing Works, of which he was the proprietor at the time of his death.

The Cambria Steel Co., Johnstown, Pa., has plans prepared for a 24-in. universal plate mill. It will be especially adapted to rolling high carbon stock and is so designed that 48-in. plates can be rolled by lifting out the vertical rolls. In this way the mill serves the purpose of a 24-in. universal mill and a 48-in. plate mill. Its installation will relieve the company's large plate mill of rolling the narrower widths. The new mill will be installed in the Gautier department.

Official announcement was made April 25 by the Baltimore & Ohio Railroad Co. of contracts being closed for 250 new locomotives that will cost, in the aggregate, over $4,000,000. The American Locomotive Co. has received the contract to build 210 consolidation type freight locomotives and 38 Pacific type passenger locomotives. Burnham, Williams & Co. (Baldwin Locomotive Works) receives the contract for five switching locomotives. The contracts call for beginning delivery in August and all are to be delivered by Dec. 1, 1905.

CANADIAN INDUSTRIES.

TORONTO, CANADA, April 25.—An active local market for building materials has been practically assured for the season by the satisfactory settlement of differences between employers in the building trade and the leading unions, which it was feared might cause a strike. Permits for building have been on an unprecedented scale and now that this danger has been averted a very busy season is anticipated. Structural steel is much in demand, a large quantity being needed in Montreal and there are increased importations from England and Belgium. There is a movement on foot for the imposition of a duty on galvanized fencing wire, but in view of the complications of the political situation and the opposition which it would be likely to evoke from the farming community, it is hardly likely to have any practical result at present.

The contract for 44,000 ft. of 10-in. cast iron tubing to be used for installing the pneumatic postal system in Toronto and Montreal has been let by the Canadian government to the Alexander Maclaren Co., of Glasgow, Scotland, at $1.50 per foot. No Canadian firm tendered for the contract. The work of laying will be done by the Toronto Pneumatic Tube Co.'s branch of a Boston firm.

The city of Montreal, after receiving the report of an expert as to the working of electric pumps in connection with water works in American cities, has decided to adhere to the system of steam pumps. Previous experiments with electric pumps proved unsatisfactory.

The Canadian General Electric Co. at a meeting held here on the 18th, inst., decided to increase its capital by the issue of 20,000 shares of common stock at $100 each. This will bring the capital up to $5,000,000. It is not proposed to issue at present more than $900,000 in new shares which will be offered to the shareholders in the proportion of one share to three of their present holdings at a premium rate of $125.

The monthly meeting of the presidents of the subsidiary companies of the United States Steel Corporation was held at the offices of the Carnegie Steel Co., Pittsburg, on Thursday and Friday, April 20 and 21. President William E. Corey attended the meeting.

RECORD OF ORE DOCKS ON THE GREAT LAKES

RAILWAY	LOCATION	DOCK NO.	NUMBER OF POCKETS	STORAGE CAPACITY TONS	HEIGHT WATER TO CENTER HINGE HOLE	HEIGHT WATER TO DECK OF DOCK	WIDTH OF DOCK OUTSIDE TO OUTSIDE OF PART'N POSTS	LENGTH OF SPOUTS	LENGTH OF DOCK	ANGLE OF POCKETS
Chicago & North Western Ry.	Escanaba, Mich.	1	184	24104	28'-10"	48'-6"	37'-0"	21'-0"	1104'	30°-30°
" "	"	3	226	30284	31'- 2"	52'-8"	37'-0"	27'-0"	1356'	45°- 0°
" "	"	4	250	32750	36'- 6"	59'-2"	37'-0"	30'-0"	1500'	45°- 0°
" "	"	5	232	43152	28'- 6"	58'-8"	37'-0"	21'-8"	1392'	40°- 0°
" "	"	6	320	58000	40'- 0"	70'-0"	50'-2"	30'-0"	1920'	45°- 0°
" "	Ashland, Wis.	1	234	42120	40'- 0"	70'-0"	48'-0"	30'-0"	1404'	45°- 0°
" "	"	2	234	25740	36'- 6"	57'-8"	46'-0"	27'-0"	1404'	42°- 0°
Duluth & Iron Range Rail Road.	Two Harbors, Minn.	1	202	40400	35'- 5"	59'-6"	49'-0"	27'-0"	1338'	38°-42°
" "	"	2	208	41600	33'- 5"	57'-6"	49'-0"	27'-0"	1290'	38°-42°
" "	"	3	170	34000	40'- 0"	66'-0"	49'-0"	27'-0"	1054'	43°-32°
" "	"	4	168	30950	37'- 0"	62'-0"	49'-0"	29'-0"	1042'	38°-42°
" "	"	5	168	33600	30'- 0"	54'-6"	49'-0"	25'-0"	1042'	38°-42°
Duluth Missabe & Northern Ry.	Duluth, Minn.	1	384	57600	30'- 0"	53'-0"	49'-0"	27'-9"	2336'	45°- 0°
" "	"	2	384	69120	32'- 0"	57'-6"	49'-0"	27'-9"	2336'	45°- 0°
" "	"	3	384	80640	40'- 7"	67'-½"	59'-0"	27'-9"	2304'	45°- 0°
Great Northern Ry.	Superior, Wis.	1	250	40500	32'- 9"	57'-0"	49'-0"	27'-8"	1525'	45°- 0°
"	"	2	350	87500	40'- 0"	72'-8"	62'-8"	32'-4"	2100'	45°- 0°
"	"	3	160	40000	40'- 0"	72'-8"	62'-8"	32'-4"	960'	45°- 0°
Duluth, South Shore & Atlantic Ry.	Marquette, Mich.	1	270	27000	25'- 0"	45'-0"	40'-0"	20'-4"	1700'	30°- 0°
" "	"	4	300	28000	27'- 9"	47'-3"	36'-8"	21'-1"	1200'	30°-45°
Lake Superior & Ishpeming Ry.	Marquette, Mich.	1	300	36000	30'- 9"	54'-0"	50'-0"	24'-7"	1282'	36°-40°
Wisconsin Central Ry.	Ashland, Wis.	1	314	48356	40'- 0"	66'-2"	36'-0"	27'-0"	1908'	30°-45°
Chicago, Milwaukee & St. Paul Ry.	Escanaba, Mich.	1	240	50400	40'-2⅛"	66'-6"	52'-0"	120-27'-0" 120-29'-0"	1500'	45°- 0°
Algoma Central & Hudson Bay Ry	Michipicoten, Ont.	1	12		34'- 0"	43'-4"	25'-0"	22'-6"	311'-9"	44°- 0°

FRICK COKE CO. ACQUIRES HECLA PROPERTIES.

(Special Telegram.)

PITTSBURG, April 26.—The H. C. Frick Coke Co. has assumed charge of the properties of the Hecla Coke Co., the change dating from Saturday, April 22. The officers of the Hecla Coke Co. resigned and Thomas Lynch was elected president.

The H. C. Frick Coke Co., Pittsburg, this week closed negotiations for the purchase of the coke properties of the Hecla Coke Co., Pittsburg, located in the upper basin of the Connellsville region. Outside of the W. J. Rainey property, this is the most valuable independent operation in the upper region, and its acquisition places the United States Steel Corporation in an almost impregnable position regarding its Connellsville coke supply. The property of the Hecla Coke Co. consists of 1,500 acres of leased coal land owned by the William Thaw estate and carries with it the privilege of adding to this leasehold from year to year. In addition to the coal property on which this coking operation is carried on, the Thaw estate owns 4,000 acres of land which is entirely undeveloped and in the heart of the Connellsville region. There are three coke works having a total of 1,072 ovens and all improvements, such as power plants, homes for miners and coke workers and general supply stores are included in the sale. The price paid for the property has not been announced, but it is reported that it is close to $3,000,000.

By the purchase of these ovens, the H. C. Frick Coke Co. owns and controls 75 percent of the coke production in the upper region and 65 percent of the entire Connellsville field. About two-thirds of the lower region has been developed by independent companies. The upper region now contains 23,281 ovens, of which the H. C. Frick Coke Co. owns outright 16,034, and it also secures 60 percent of the coke shipped from the ovens of the Oliver & Snyder Steel Co., the latter's three plants having 1,108 ovens, while it owns 50 percent of the capital of the Hostetter Connellsville Coke Co. of Pittsburg, operating 707 ovens, and secures half the output from the two Hostetter plants. W. J. Rainey, of Cleveland, is the largest independent operator in the entire region, with 2,373 ovens. The remaining ovens, aggregating 3,000, are widely distributed among blast furnace and merchant interests, and that the independent iron and steel producers have not secured control of more property in the upper region indicates that they underestimated the value of this property at a time when the H. C. Frick Coke Co. was quietly securing possession of the most valuable coal land available.

In the lower region the H. C. Frick Coke Co. operates 2,250 ovens, while the remaining 4,492 ovens are operated independently. In this region the independent iron and steel interests own and are interested in less than 1,000 ovens, but several large interests are now endeavoring to secure extensive tracts for the erection of coking plants, while the Republic Iron & Steel Co. has already 400 ovens under way and the Struthers Coal & Coke Co., of Cleveland, has coal property on which 140 ovens are to be erected. Out of a total of 30,023 ovens in the upper and lower Connellsville region, the H. C. Frick Coke Co. now owns outright 18,284, and controls more than 50 percent of the output of an additional 1,815 ovens.

The bulk of the output of the Hecla Coke Co. was sold to two large steel interests in the East and to the Lackawanna Steel Co., Buffalo, N. Y. The latter concern, about six months ago, closed a three-year contract for the delivery of 300,000 tons of coke annually at a price approximating $1.75 and this contract will no doubt have to be filled by the H. C. Frick Coke Co. The other two steel concerns have shorter contracts and these will not be renewed. This coke will either have to be supplied by the remaining independent producers or the companies will be compelled to secure their own plants. The Lackawanna Steel Co. has been endeavoring to obtain coal property in this region for some time, but as yet the negotiations have not been successfully terminated. It is altogether probable that when the coal land is acquired it will be shipped from the mines to Buffalo to be coked in the company's by-product coking plant which is now idle.

Shenango Furnace Co.

(Special Telegram.)

PITTSBURG, April 26.—On Monday, May 1, the Shenango Furnace Co., Pittsburg, takes over the Mabel furnace of Perkins & Co. at Sharpsville, Pa. The purchase was closed six months ago, but on account of pending contracts control could not be assumed sooner. This gives the Shenango Furnace Co. four furnaces at Sharpsville and makes the concern the largest independent producer of Bessemer and basic iron in the two Valleys. These furnaces are outside the Bessemer Furnace Association.

Cotton Tie Prices Fixed.

(Special Telegram.)

PITTSBURG, April 26.—The meeting of cotton tie manufacturers has been held and the price for this season fixed at 85 cents a bundle in 5,000-bundle lots. The market has not yet been declared open, however, and manufacturers refuse to give out the time of opening. It is believed to be May 1, however. The opening price last year was 75 cents a bundle in 5,000-bundle lots and was later advanced to 85 cents. About 50,000 tons of ties are used for baling the season's cotton crop.

All Carnegie Stacks in Bl

The Zanesville blast furnace of the Carnegie Steel Co., located at Zanesville, O., was blown in on Saturday, April 22, after an extended idleness. The firing of this stack accentuates the pressure on all the furnaces of the Carnegie Steel Co. for iron, as it has been the intention of dismantling this stack as further operations or repairs were considered unprofitable. With the blowing in of this stack, the Carnegie Steel Co., for the first time since it has come into possession of 51 blast furnaces, has all in operation. The operation of all these furnaces is furthermore all the more remarkable, as an idleness of 10 percent is the average for relining and general repairs. Most of this work was done during the depression last summer, but the present pace cannot be continued very long. Even if no repairs are required unforeseen accidents will sooner or later put some of them out of commission. C. E. Evarts has been appointed superintendent of the Zanesville furnace and R. E. Calle succeeds Ralph Degman as master mechanic.

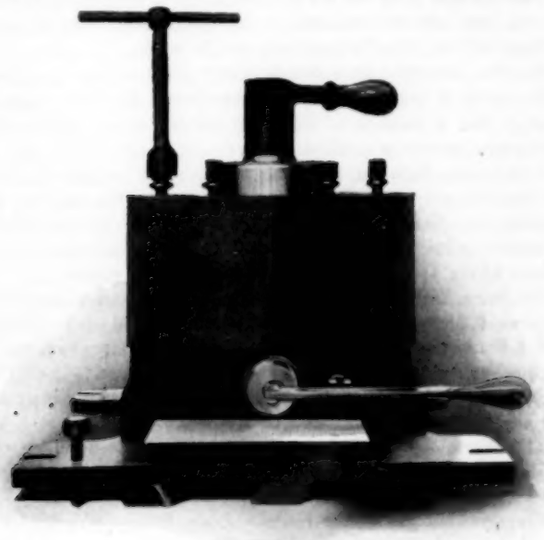
New Merchant Mill at Clairton. Pa.

The Carnegie Steel Co. has decided to erect an 18-inch merchant mill at its Clairton works, Clairton, Pa. The mill is designed for rolling standard merchant sizes on which large tonnages can be secured and will also roll light shapes. The mill will consist of four stands of rolls, one stand to be two high and the other three three-high. The contract for the erection of the mill proper has been awarded to the Mesta Machine Co., of Pittsburg. The mill will be continuous in operation, the material to be passed back and forth instead of continuing straight ahead, as is the case in most continuous mills.

The Chester Department of the National Tube Co., Pittsburg, located at South Chester, Pa., will be shut down on Monday, May 1, and it is extremely doubtful whether the mill will again resume operations. The mill makes a specialty of rolling iron pipe. Many of the workmen are already leaving and have secured positions at the new works, Lorain, O., and, while no official announcement has yet been made, it is probable that the mill will be dismantled in the near future.

NEW TURRET FOR LATHE CARRIAGES.

The engraving illustrates a new turret on carriage recently brought out by the Lodge & Shipley Machine Tool Co., of Cincinnati, in response to a demand for a device of this description, to have stiffness and rigidity commensurate with the increase in cutting power of tool steel and still be interchangeable with the regular compound rest. As will be seen from the illustration, the principal departure from the ordinary standard is in the plate on which the cross slide moves. This is made to slide onto the regular carriage dovetail and is secured in place by four bolts in the tee slot of the carriage wings. The cross slide is made with a bearing about twice as wide as the regular compound rest. The plate is slotted, permitting the cross feed nut to extend upwards sufficiently for attachment to the cross slide, so that the cross feed can be applied to the turret. As no movement of the plate takes place, the regular carriage dovetail is relieved of all wear.



A NEW TURRET FOR LATHE CARRIAGES.

Dravo, Doyle & Co., Pittsburg, dealers in power plant equipment, report demand very heavy and their recent sales have been unusually large owing to the large amount of new construction. Their recent sales of Ball engines are as follows: Fort Pitt Hotel, Pittsburg, three 135 h. p.; Iroquois Apartments, Pittsburg, three 120 h. p.; American Sheet & Tin Plate Co., Bridgeport, O., one 250 h. p.; Lanoconing Light & Power Co., Lanoconing, Md., one 175 h. p.; Corrigan, McKinney & Co., Cleveland, O., one 175 h. p.; McKinney Mfg. Co., Allegheny, Pa., one 450 h. p.; Page Woven Wire Fence Co., Monessen, Pa., one 400 h. p. and the Pennsylvania Power Co., Ellwood City, Pa., one 500 h. p. Among the recent sales in DeLaval turbine machinery by this company is the plant of the Indiana Cold Storage Co., Indiana, Pa. This plant will consist of two 200 k. w. DeLaval steam turbine alternators, with two independent 10 k. w. steam turbine exciters. The plant also includes two Wheeler admiralty type surface condensers, and Edwards air pumps. This plant will be one of the most up-to-date and economical plants, as far as the cheap production of electrical power is concerned, its size considered, of any plant in this part of the country. A DeLaval steam turbine, direct connected to a DeLaval Centrifugal pump, with a capacity of 8,000,000 gallons per day, is being installed at the South Side plant of the Jones & Laughlin Steel Co., Pittsburg. Recent sales of Cochrane heaters were made to the Berwind-White Coal Mining Co., Windber, Pa., three; Pennsylvania Railroad, Hollidaysburg, and Pennsylvania Railroad, Altoona, Pa.; New Kensington Electric Light & Power Co., New Kensington, Pa.; Y. & O. Coal Co., Martins Ferry, O.; Iroquois Apartments, Pittsburg; Economy Tumbler Co., Morgantown, W. Va.; Standard Tin Plate Co., Canonsburg, Pa.; White Oaks Fuel Co., Scarbro, W. Va.; Knickerbocker Coal Co., Briar Creek, W. Va.; Bessemer Limestone Co., Lowellville, O.; W. J. Rainey, Connellsville, Pa.; Imperial Colliery Co., Burnwell, W. Va.; Indiana Cold Storage Co., Indiana, Pa.; A. J. Logan & Co., Pittsburg, Pa.; Superior Steel Co., Carnegie, Pa.; American Bridge Co., Ambridge, Pa., and Atlas Coke Co., Helen, Pa.

The executive offices of the American Steel Foundries until lately were located at No. 74 Broadway. With the object of concentrating all departments it was found necessary to lease the eleventh floor of the recently completed building at No. 42 Broadway, of which possession has already been taken. The executive officers of the American Steel Foundries are starting, simultaneously with the removal, a new system of accounting and distribution of orders, which will improve the organization and simplify their work. This will assist in taking care of the large orders now coming, in view of the increased demand for new equipment by the railroads and other large producers. The output of the company's eight plants for all kinds of steel castings is very large and the acquisition of the Simplex Railway Appliance Co. added materially to the equipment for filling the requirements of railroad companies and car builders.

That cement manufacturers are making important changes and contracts for the installation of machinery is shown by the recent orders received by F. L. Smidth & Co. of New York. Recently they made one shipment to the Lehigh Portland Cement Co., at West Coplay, Pa., of seven carloads containing 3 Smidth kominuters and four Davidsen tube mills. In addition they have taken the order of the same company for 18 kominuters and tube mills for use in the raw and clinker departments of a new mill in Southern Indiana. They have contracted with the Lawrence Cement Co. of Pennsylvania to do the engineering work and supply the grinding machinery for the large extension to its plant in Siegfried, Pa. Orders for kominuters and tube mills have been received from J. B. Speed & Co., of Louisville, Ky., for their new Portland cement plant at Speeds, Ind., the raw material and clinker grinding being all done with these machines. The Elk Portland Cement & Lime Co. will reconstruct its mill at Elk Rapids, Mich., using the dry process instead of the wet process as heretofore. Smidth & Co. are doing the engineering work as well as supplying some of the grinding machinery.

The Seamless Tube Co. of America, Pittsburg, expects to place its new plant at Monessen in operation before the end of the week. A scarcity of billets prevented an earlier start. The mill will have an output of 100 tons daily. Tubing will be manufactured by the Briede process, all of the necessary machinery having been shipped from Germany. The company controls the sole right of manufacturing by this process in this country.

Dodge & Day, engineers, Philadelphia, who for three years have designed the electrical equipment for operating hoisting and conveying machinery built by the Dodge Coal Storage Co., will also have charge of similar work in connection with telpherage apparatus. This will not be manufactured by the Dodge Coal Storage Co., which has acquired the United Telpherage Co.'s interests.

The partnership of Philip C. Smith, Harris Tabor and Howard C. Williams, doing business under the firm name of Vulcan Facing Co., Easton, Pa., has been dissolved, and the business will be conducted by Philip C. Smith under the name of Vulcan Facing Co.

NEW 30-INCH VERTICAL BORING MILL.

The Colburn Machine Tool Co., of Franklin, Pa., has a new 30-in. vertical boring and turning mill, which is illustrated in Figs. 1 and 2. This mill has a swing of 30 in. and will take in work 18 in. high. It has sixteen changes of speed in exact geometrical progression, varying from 3.2 to 106.2 revolutions per minute.

The mill is furnished with plain table, with or without chuck jaws, or with three or four jaw combination independent and universal chuck. The main driving gear is bolted to the lower part of the chuck or table and is driven by a spur pinion. The table spindle has a large phosphor bronze conical bearing at the top and the spindle extends downward nearly to the floor and has two large vertical bearings to resist side strains. An excellent system of lubrication supplies oil to all

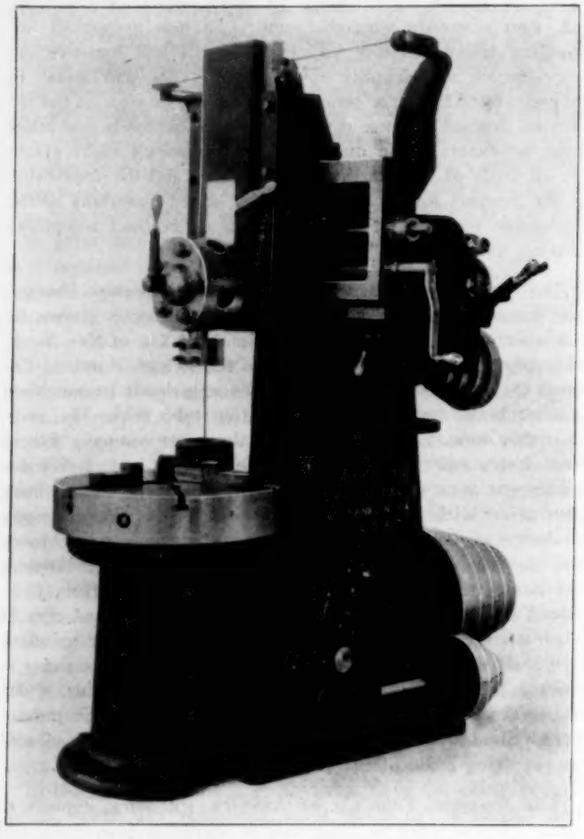


FIG. 1—A 30-INCH BORING AND TURNING MILL.

these bearings. The back gearing is very powerful and the gears are thrown in and out by means of the handle shown at the side of the machine. This can be done instantly without stopping the mill.

There are eight feeds driven by a wide belt running on feed cone pulleys of larger diameter. The feeds are reversed by means of the hand lever shown directly above the upper feed cone pulleys of large diameter. The feeds are reversed by hand or power. A graduated scale 24 in. long is attached to the turret slide and an adjustable pointer moves over the scale, indicating at all times the travel of the turret slide. The cross slide has a travel of 17½ in. either by hand or power, and is equipped with automatic stop for tripping the feed before the head comes to the center stop.

The turret is 10¼ in. in diameter and has five holes bored to fit tool shanks 2¼ in. in diameter. The turret has a clamp lever which remains in a vertical position when released. The lock bolt is of hardened tool steel, ground perfectly true, and works in a hardened tool steel index ring also accurately ground.

A double friction countershaft is furnished, having two pulleys 14 and 20 in. in diameter for 4-in. belt. Both pulleys run in the same direction, one at 150 and the other at 375 revolutions per minute. The weight of this 30-in. mill is 4,500 lb., and it occupies a floor space of 4 ft. 7 in. by 5 ft. 4 in.

Eastern Pennsylvania.

HARRISBURG, Pa., April 25.—Conditions in the iron and steel trade in this part of the Keystone State are booming and almost every available furnace is either in blast or undergoing repairs with an idea of being started at an early date. A number of mills are also being started.

Orders for work include a fair proportion for export. The Pennsylvania Steel Co. has been rolling rails at Steelton for shipment abroad and plate contracts have come to Pennsylvania concerns for operations in Europe.

The Portage Iron Works at Duncansville have been started after a long idleness, two mills being in operation and the idle rolling mill at Danville has been put to work.

For the first time in a decade every blast furnace in Dauphin county is in operation, the Pennsylvania Steel Co. having started No. 3 furnace at Steelton, making four working in that town and three in Harrisburg.

The Jansen Iron Co. is taking steps to put its mills at Columbia, Lancaster county, in operation soon. This company is moving its works from Oxford, N. J., to this state. Other Columbia mills are all in operation, but the furnaces of the Susquehanna Iron & Steel Co. have not been started.

The Ellis Keystone Agricultural Works, of Pottstown, have purchased the patterns, flasks and other material of the Fleetwood Foundry & Machine Works at Fleetwood, which company's plant was damaged by fire some time ago. The Ellis company stockholders will vote on a proposition to increase the capital stock from $50,000 to $100,000.

The Warwick Iron & Steel Co. is arranging to build a steel bridge over the Schuylkill at Pottstown for conveyance of cinder. Both furnaces are in operation.

The stockholders of the Carlisle Body & Gear Works have decided to rebuild at once. Over $25,000 of new capital has been subscribed.

The Pennsylvania Steel Co. has started one of its North Lebanon furnaces. The other is being rushed and will be blown in within a short time from present indications.

The Nittany Iron Co. has advanced the wages of its employes at Bellefonte 10 percent. The company is running its furnace at that place with a fine product.

The Geiser Mfg. Co., Waynesboro, has just completed the building of a 35-h. p. steam plow. It is to be shipped to Spain and will draw twelve plows, being the largest ever constructed by the company. Recently the company contracted for a 30-h. p. plow to be built for a Canadian firm.

The Reading Iron Co.'s new mill at Reading is to contain nineteen puddle furnaces and work has been started with vigor.

A new bridge at Catawissa to replace that destroyed by the floods of last year will be built by the Penn Bridge Co., of Beaver Falls, Pa., at a cost of $124,900.

At the fourth annual meeting of the stockholders of the Pennsylvania Steel Co. the following were elected to serve as directors for three years: Luther D. Brent, Overbrook, Pa.; Arthur Brock, Philadelphia; John Cassels, Washington, D. C.; Dawson Coleman, Lebanon Pa.; George H. B. Martin, Camden, N. J. An amendment to the by-laws was adopted, changing the time of the annual meeting from the third Tuesday in April to the second Monday in May.

The United States Cast Iron Pipe & Foundry Co. has declared its regular dividend, 1¾ percent on its preferred stock, payable June 1.

FOREIGN IRON AND STEEL NOTES.

The firm of Thos. Butlin & Co., of Wellingborough, Eng., operating the blast furnace plant known as the Irthlingborough Iron Works, gave their employes a dinner recently. This is one of the few concerns in England which still follows the custom once much more common of bringing employers and employes together once a year at the dinner table. The dinner was presided over by W. H. Butlin, chairman of the company. The *Iron and Coal Trades Review* says in comment: "In these hustling and bustling days, this excellent and commendable custom has to a great extent been abandoned and each of the two great interests responsible for industrial organization and development appears to be mainly concerned to have its 'pound of flesh.'" Mr. Butlin was one of the members of the Iron and Steel Institute who made the trip to the United States last fall.

Announcement has already been made in these columns of the award of the Bessemer gold medal by the Iron and Steel Institute to Prof. John Oliver Arnold, of Sheffield, Eng. His career is interesting. He was born in 1858 and received a grammar school education at Birmingham. Subsequently he became a cadet in the navy and was later a midshipman in the Royal Naval Reserve. At 20 he was in the laboratory of the Sheffield Steel & Iron Works and ultimately reached a position where he was chemist in chief and in charge of all physical tests. He left this company to assume another responsible position with the Farnley Iron Works, at Leeds, and then returned to Sheffield as manager and chemist of the Spanish Steel Works. He also practiced as a consulting metallurgist. The Institution of Civil Engineers presented him with the Telford premium in 1887 for a paper on the influence of chemical composition on steel tires. He was appointed professor of metallurgy at the University of Sheffield, then known as the Sheffield Technical School, in 1889. Six years later he again received the Telford premium and a gold medal for an investigation of the influence of carbon on iron. A paper on the structure of metals gained him a premium from the Institution of Engineers and Shipbuilders in 1898 and he has recently been appointed one of the three special lecturers on technology to the British Association during the prospective trip to South Africa.

Col. Charles Lowthian Bell, son of the late Sir Lowthian Bell, has retired from the management of the Clarence Iron Works, near Middlesborough. The employes of the Clarence plant are having four pictures painted by Norman Crosse, two showing the blast furnaces, one the steel works and the other the coke ovens. They will be presented to Col. Bell shortly as a memento of the esteem he has earned during his long connection with the Clarence plant.

The Bengal Iron & Steel Co., of Barrakur, India, have commenced the manufacture of rolled steel from raw material of native production. At present the output in 500 tons per week, but this can be doubled.

Graham, Morton & Co., Ltd., engineers and contractors, of Leeds, have a contract for the construction and erection of a large warehouse at East Quay, South Dock, for the Alexandra (Newport and South Wales) Docks and Railway Co. The building is to be 200 ft. long and of 70 ft. span, and the whole of the iron work will be in position eight weeks from the date of the order. This consists of roof principals, purlins, riveted compound steel girders, rolled steel girders, the usual gutterings, etc., and a specified number of casements constructed to open in the center.

At a recent meeting of the Coventry Engineering Society, W. Deakin, of Birmingham, read a paper on milling machines. Mr. Deakin had some doubt whether the present tendency to multiply milling machine feeds and speeds was well advised in view of the few workmen who are capable of properly making use of these facilities. He considered the most fruitful cause of bad results with milling machines to be in a neglect to keep the cutters in good condition.

Sir W. G. Armstrong, Whitworth & Co., Ltd., have secured the British Admiralty contract for the supply of all high-speed steel required in the home and colonial dockyards during the next three years.

Hulse & Co., of Manchester, are giving considerable attention to machine tools for steam turbine work. The firm has under way a shaft lathe, boring machine and planer specially designed for this class of work.

The Administrative County of London and District Electric Power Co., which is responsible to a Committee of the British House of Lords, is planning to construct three electric plants for generating current to supply the whole of London and those suburbs controlled by the London County Council. Each plant is to consist of six turbo-generators, each of 10,000 K. W. normal and 20,000 maximum capacity, making a maximum total of 360,000 K. W. As these power units are larger than

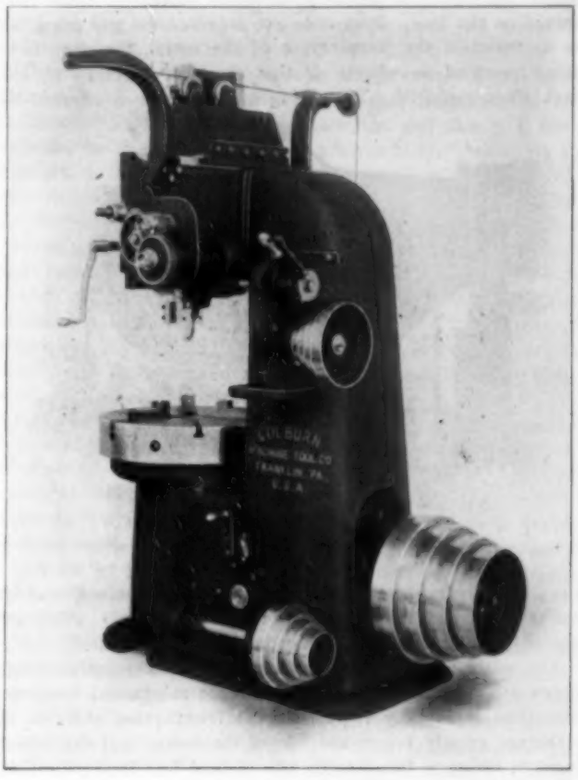


FIG. 2—ANOTHER VIEW OF THE 30-INCH MILL.

any ever constructed, experts have been appointed to decide upon the practicability of units of this size. The electrical expert chosen for the problem is C. F. L. Brown, of Brown, Boveri & Co. This company acts as consulting engineer on alternating current propositions for the Crocker-Wheeler Co., of Ampere, N. J.

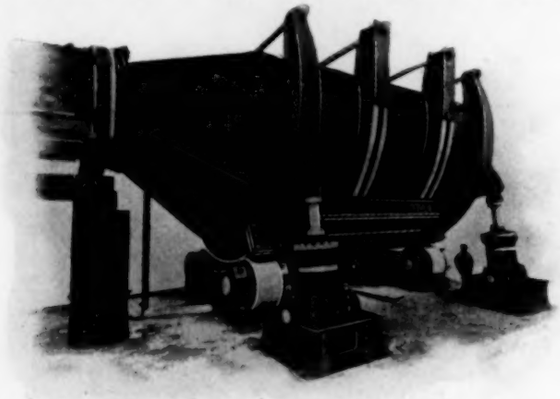
Meetings of all of the subsidiary companies of the United States Steel Corporation, excepting those of the Federal Steel Co., were held last week, at which the retiring directors were re-elected. The meeting of the Federal Steel Co.'s subsidiary companies will be held in June.

At a meeting of the directors of the Pittsburg Coal Co., Pittsburg, held last week, the 25-year coal contract closed with the United States Steel Corporation was ratified. The deal does not cover the purchase of the company's coke output as reported or any part of it. The regular quarterly dividend of 1¼ percent on the preferred stock was declared.

ALLEN AND DAVY METAL MIXER.

London *Engineering* illustrates and describes a metal mixer built by Davy Bros., Ltd., of Sheffield, Eng., for the Ebbw Vale Steel Co. under patents of Charles Allen and Charles Davy. This mixer is capable of holding 750 tons of metal, its large capacity being required for the extensive additions that are being made to the company's steel plant; and it will also serve as a reservoir for the week-end make.

The body of the mixer is formed of a double thickness of steel plating supported at each end on two circular massive steel rockers of box section. These rockers are machined on the under side, and rest on turned-steel rollers, 4 ft. 6 in. in diameter. The rollers are mounted on bearings in cast steel girders. The bottom of the mixer is stiffened by a number of rolled steel joists, 24 in. deep, in order to prevent any tendency to bulge due to the weight of the metal; and the top is held together by four 6-in. tie bolts. The ends are coned, the cones terminating in heavy cast steel rings machined on the face. Port ends are provided for gas firing, so as to maintain the temperature of the metal, the port ends being mounted on wheels, so that they can be easily moved back when required. The tilting of the mixer is effected by



A 750-TON METAL MIXER.

two large hydraulic cylinders mounted on trunnions, and of sufficient stroke to empty the mixer completely when required, the pouring spout being on the opposite side.

The mixer will have an acid lining, and consequently no side doors are required. It is of much more substantial construction than is actually requisite for strength; but stiffness of structure greatly favors the life of the lining, and the movement in tilting is found to be smooth and free from vibration.

This type of gas-fired mixer possesses the convenience that the metal, as received from the blast furnace, can be retained in its molten condition for an indefinite period, the gas-firing being easily regulated to replace any lost heat, or to increase the temperature if required.

For basic steel, doors are provided both on the sides of the body of the mixer and on the cone ends, so as to make the whole of the lining easily accessible for inspection and fettling. One extra large door is sometimes provided for charging heavy lumps of scrap. When much melting of scrap and deoxidizing is to be done in the mixer, the port ends are made larger than in the present case, so that work can be carried out at a higher temperature. In these cases the cone ends of the mixer and the port ends are provided with cooling blocks, and the port ends are fitted with hydraulic draw-back gear. Davy Bros. have at present in hand a mixer of 150 tons capacity for a steel works in China.

The American Locomotive Co. announces that its general offices are now located in the Trinity Building, 111 Broadway, New York.

RAILROAD EQUIPMENT EXHIBITS.

WASHINGTON, D. C., April 25.—Machinery, supply and railroad equipment interests will be well represented at the International Railway Congress which will open in this city on May 3. It is the first meeting of the body ever held in America. These congresses are held at intervals of five years, and the previous sessions have been in London, Paris, St. Petersburg and other European cities. The attendance at the coming congress will embrace about 600 foreign delegates and about 400 American delegates. There will be a representative exhibition of American railway appliances for which there have been constructed a number of buildings on the large plat of ground south of the Washington Monument. The main building contains 21,000 sq. ft. of space exclusive of aisles and passageways, and the other buildings have an aggregate of 700,000 sq. ft. of space.

The exhibitors will include the following: Bettendorf Axle Co.; R. D. Wood & Co., of Philadelphia; Paul Dickinson & Co.; Fairbanks-Morse Co.; American Hoist & Derrick Co., St. Paul, Minn.; Adams & Westlake Co., Chicago; United States Metal & Manufacturing Co.; American Steel Foundries; Weber Rail Joint Co. of New York; Pyle National Electric Headlight Co.; Pennsylvania Steel Co.; P. Carey Manufacturing Co.; Continuous Rail Joint Co.; Vacuum Cleaner Co. of New York; Rand Drill Co.; Municipal Engineering & Contracting Co.; King-Lawson Dump Co.; Victor Stoker Co.; T. H. Symmington Co.; Farlow Draft Gear Co. of Baltimore; International Nickel Co. of New Jersey; McCord & Co.; Federal Co. of Chicago; Booth Water Softening Co. of Grand Rapids, Mich.; Barnett Equipment Co.; Westinghouse Air Brake Co.; Gold Car Heating & Lighting Co.; Universal Railway Supply Co. of Baltimore; Chicago Pneumatic Tool Co.; N. L. Hayden Manufacturing Co. of Columbus, O.; Railway Signal Co.; Kinsman Railway Signal System; Aurora Machine Co. of Aurora, Ill.; Chicago Car Heating Co.; Ingersoll-Sergeant Drill Co.; American Valve & Meter Co.; Electric Construction Co. of Cleveland, O.; Otto Gas Engine Works; Hall Signal Co.; Barker Mail Crane Co.; Wells Light Co.; Elliott Frog & Switch Co.; Consolidated Car Heating Co.; Gould Coupler Co.; New York Air Brake Co.; Davis Pressed Steel Co.; Robins Conveying Belt Co. of New York; Merrill-Stevens Manufacturing Co. of Kalamazoo, Mich.; Benjamin Atha & Co., of Newark, N. J.; Baldwin Locomotive Works of Philadelphia; Keefer Metallic Tie Co. of Cincinnati; and Chicago Railway Equipment Co.

The employment in the tinplate industry has picked up wonderfully since January, 1904, and the demand for labor is quite equal to the supply, says Vice-Consul Phillips of Cardiff, Wales. At the end of January, 1905, 403 mills were in operation. This compares favorably with the return of a year ago, which gave a total of 347 mills working. Out of 77 works open, 64 have all their mills (346) in operation, while the remaining 13 have 57 mills working out of a total of 78. The estimated number of persons employed at the 403 mills is 20,450.

A. C. Bunker and W. C. Appleton, alternating current engineers, have become associated with the Crocker-Wheeler Co., Ampere, N. J., in the engineering and contracting departments respectively. Mr. Bunker has been connected with the Stanley Electric Mfg. Co. on the Pacific Coast. Mr. Appleton has acted as engineering salesman for the General Electric Co. in the Atlanta territory.

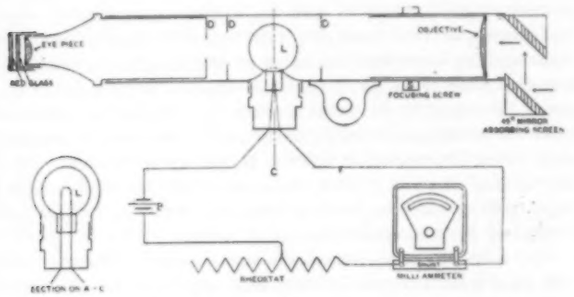
Of the $17,000,000 new five percent bonds of the Colorado Industrial Co. and $3,400,000 of the Colorado Fuel & Iron Co.'s new common stock, offered to stockholders, $9,373,000 in bonds and $1,874,600 in common stock wore taken. The stockholders paid $7,498,400 for the $9,373,000 in bonds receiving new stock to the amount of $1,874,600 as a bonus.

HIGH TEMPERATURE MEASUREMENTS—IV.

BY S. H. STUPAKOFF.

While the eye is not always a reliable medium for determining high temperatures, yet in common practice no other agent is more frequently employed, nor with as great an amount of personal satisfaction. By using a blue cobalt glass as a screen one cuts out the yellow and green radiations of the spectrum and in this way exaggerates the changes of hue. Thus observations are greatly facilitated. But since the ratio of the transmitted red and blue radiations varies with the thickness of the glass and with their absolute intensity, two pieces of glass of different thickness and different in density of color will give different results. And unless a glass which has been accidentally broken can be exactly duplicated, the eye must be newly trained for another one which is to take its place.

In industrial establishments otherwise modern in every respect, the task of passing on the progress of metallurgical operations is entrusted in such cases usually to the judgment of old mechanics, who by years of training and experience, and only after many costly failures, at the expense of their employers attain a fairly good idea of high and low and of suitable and unsuitable temperatures for their particular purpose. This, at best, is but a crude and unreliable way of approximation, quite objectionable in modern manufacturing practice. It is imperative in these days of exacting requirements and close



HOLBURN-KURLBAUM OPTICAL PYROMETER.

competition, that all costly factors of chance be eliminated, and all guess work give place to definite information easily accessible to any one of the trusted employes of a factory.

We invariably connect high temperatures with high illuminating powers; we mistake cause for effect, and erroneously grade the one set by the other. This mode of reasoning would be right if both increased in the same ratio and if there existed no variation in the emissive power of various substances.

The color of an incandescent body depends upon the emission of certain light rays of definite wave lengths, and the relationship of such rays to the temperature is governed by a scientific law. Kirchoff enunciated the law that "the diffusing. and reflecting or transmitting power at a given temperature, vary from one body to another," and "the emissive and the diffusive power vary always inversely, as complements to each other." LeChatelier found a law of variation of the intensity of the red radiations as function of the temperature, for which he has given us a formula. Stephen established experimentally in 1879 the first law of radiation, which was deduced since theoretically by Boltzmann from the thermo-dynamic theory, and by Planek from the electro-magnetic theory. They were followed by Paschen, Wanner, Lummer, Pfringsheim, Wien and Plauk, who made a long series of investigations. The important fact which was established by this work is that "with increasing temperature the intensity of the emitted light increases very rapidly. If, for example, the intensity of the red light corresponding to the Frauenhofer line C of the spectrum at a temperature of 1000 degrees C. is assumed as unity, then the intensity will be 10 times greater at 1200 degrees, 804 times at 1800 degrees and 2134 times at 2000 degrees." This enormous increase in intensity of light gives us the means to make use of the variation in radiation for the determination of high temperatures by properly constructed photometric apparatus; and it is upon this principle that the best of our modern optical or luminous radiation pyrometers are constructed.

Since optical pyrometers indicate high temperatures by means of photometric measurement of the luminous radiations of heated substances, they are only applicable where the heated body itself emits light—that is, from about 1100 degrees F. upward. The study of the theory of construction of this class of instruments is quite intricate, as it involves an intimate knowledge of optics and of the laws of radiation. It is impossible to show the consequence of Kirchoff's generalizations without a full mathematical discussion. And as it is not the object of these articles to enter into this part of the subject, we must refer readers who desire to look into it to the respective literature on this matter, which may be found scattered in the proceedings of various physical and scientific societies.*

There is but a single instance in which heated bodies emit illuminations of equal intensities at equal temperatures, regardless of the nature of their substance, and that is if they have the shape which is known as a black body. According to Kirchoff, a theoretically black body is a hollow space entirely surrounded by walls at a uniform temperature, which are impervious to heat and perfect reflectors. A small hole pierced through such a wall for observation does not alter the luminous radiations in a measurable degree. The nearest approach to such conditions in ordinary practice are closed furnaces, and in many instances it may be considered that the radiation of bodies inside furnaces are sufficiently close approximations to black body radiations for most of the requirements of technical processes.

However, it has been established that under all other ordinary conditions, the emissive power and the relative proportions of visible radiations received or given off varies in bodies of different substances; consequently, at the same temperature, the intensity of emitted luminous radiation varies likewise with different bodies. In other words, the color caused by the same degre of heat in different substances is not alike and it is no reliable guide or measure for their temperature.

Methods are now available for the determination of temperatures by measurement of the energy of total radiation; that is, the energy of both the light waves which affect the eye and the longer waves, sometimes called heat waves, which do not affect the human eye. A second method, which is mostly employed, is based on the photometric measurement of the intensity of a single color, i. e. red, which is chosen because it is the first one to become visible. The above form the basis of construction of the principal optical pyrometers, which, eliminating unavoidable personal errors of observation, introduced by the intervention of the eye, and notably diminishing their precision, may be called very reliable instruments.

Optical pyrometers are especially serviceable for measuring temperatures of bodies which are inaccessible, and of those which are in motion; also to determine uniformity of heating over large areas, and very high temperatures lying beyond the melting point of platinum. LeChatelier compares in his optical pyrometer the image of the object with that of the flame of a comparison lamp. Both appear side by side on a sharp-edged mirror of black glass placed at 45 degrees in the focus of a telescope. A variable cat's-eye diaphragm serves for toning the images to the same intensity. In front of the objective of the telescope is a cat's-eye diaphragm for the purpose of

*See Verhandlungen der Deutschen Physikalischen Gesellschaft, Sitzungsberichte der Berliner Akademie, Wiedemann's Annaleu, Annaleu der Physik, etc., mostly from 1896 to 1991.

varying its effective aperture; and beyond, an accessory for tinted absorbing glasses. The observations are made through an ocular screened by a red copper or a green mono-chromatic glass, which serve respectively for low and very high temperatures. Particular care is taken in the selection of the absorbing glasses, that they may be free from absorption bands and that they possess an absorbing power of the greatest possible uniformity.

Measuré and Nouel employ an optical tube with a quartz plate between two Nichols prisms, which are placed in the optical axis of the eyepiece. One of these prisms serves as a polarizer and the other, a rotatable one, as analyzer. This arrangement obliterates the central portion of the spectrum, and a rotation of the analyses enables an adjustment of the instrument to the well defined transition point between the red and green radiations emitted by incandescent bodies. The angular adjustment of the apparatus furnishes therefore the means for the determination of the degree of temperature which corresponds to the observed emission of the selected luminous rays.

The Wanner optical pyrometer excludes certain rays of light of absolute wave length from the spectrum of the light under observation, and follows in this respect the principle of Measuré and Nouel. But the two instruments vary radically in their mode and manner of construction. The Wanner retains only the red rays for the purpose of photometric measurement and compares these with a standard furnished by the light of a small incandescent lamp. The field of vision is divided into two halves, one of which is illuminated by the light emitted by the hot body under observation, and the other one by the comparison lamp. The intensity of illumination is equalized by rotating an eye piece with Nichol prism. The angle of rotation gives a clue to the determination of temperature which is found on a table accompanying the instrument. A storage battery which furnishes the necessary current to energize the small incandescent lamp forms part of the outfit.

The Morse thermo gauge is a mechanical device, which, barring its shortcomings as a physical precision instrument, belongs to the same category as the few others which have just been briefly described. Its inventor introduces a standard light of changeable graduation into an ordinary lantern tube, and compares with it the unrestricted total intensity of radiations emitted by the body under observation. Both sources of light appear in the restricted field of vision where a comparison of the brilliancy of both is to be effected. The comparison light is furnished by an incandescent lamp with spirally shaped filament which is to be adjusted to any desired shade and thus to be brought to the same hue as that of the body under observation, by introducing an adequate resistance into the lamp circuit. In this manner the filament can be made apparently to disappear from the view of the operator. The corresponding amperage of the current passing through the lamp is proportionate to its brilliancy or to the corresponding temperature of the heated body. It may serve therefore as a measure of the latter by making due allowance for the variation of intensity of radiations inherent to the changes of temperatures. The electric-current for the comparison lamp is furnished from a small dynamo, or it may be tapped directly from the main line of an existing plant.

The instrument is capable of an accuracy of 5 degrees or so in the region of temperatures used for the hardening of steel, etc.* The long spiral filament of the high voltage lamp is objectionable, as no two portions of it emit the same light. A small low voltage lamp would furnish far better results. The use of the instrument is fatiguing on the eye, as neither objective nor eye piece is provided for; the eye accommodates itself therefore unavoidably back and forth from the lamp to the heated body.

The accompanying sketch represents the Holborn-Kurlbaum optical pyrometer. The following description is kindly furnished by Dr. C. W. Waidner, of the Bureau of Statistics, Washington, D. C.:

"An image of the hot incandescent body under observation is formed in the focal plane of the objective where is found the filament of the small 4-volt lamp. The current through the filament is varied until the tip is of the same color as the incandescent body when it will completely merge with it and fade from view. The current through the milliammeter is then a measure of the temperature if the instrument has been properly calibrated. The instrument is based on the same principle as that of the Morse and was independently brought out in Germany about the same time."

The Holburn-Kurlbaum pyrometer has a small 4-volt incandescent lamp L with a hair-pin filament. This is mounted in the focal plane of the objective and the eye piece of a telescope provided with stops at D. There is a focusing screw at S for the objective. The lamp circuit is completed through a 2-cell storage battery B, a rheostat, and a milliammeter.

*Mr. S. N. Brayshaw, of Manchester, England, said at the General Meeting of the Institution of Mechanical Engineers, held in London, Jan. 15 and 29, 1904: "Mr. Stead spoke about the sharply defined line on the diagram at which steel is hardened. He (Mr. B.) was in a position to say that at the hardening point one degree centigrade made a perceptible difference in the hardened steel. Five degrees centigrade made the difference between good and bad hardening.

Exports and Imports for Twenty Years.

An official statement just issued by the Department of Commerce and Labor through its Bureau of Statistics compares the imports and exports of iron and steel manufactures in the first eight months of each fiscal year from 1885 to 1905. In 1885 exports of iron and steel manufactures in the first eight months were half the value of imports of iron and steel manufactures, being $11,500,000, as against $23,000,000 of imports. In 1905, in the same months, the exports of iron and steel are about six times as much as the imports of iron and steel, being $85,500,000, as against $14,000,000 of imports. Thus the balance of trade in iron and steel, which in 1885 showed a total of $11,500,000 in favor of imports, shows in 1905 to date a total of $71,500,000 in favor of exports.

The following table shows the imports and exports of iron and steel manufactures in 1885, 1890, and annually from 1895 to 1905, the figures in each case being for the first eight months of the fiscal years named:

Eight mos. ended February.	Imports of iron and steel.	Exports of iron and steel manufactures.
1885	$23,007,651	$11,541,505
1890	26,966,085	16,735,594
1895	15,288,485	20,589,340
1896	18,135,334	25,721,986
1897	10,517,588	35,781,809
1898	8,207,977	42,864,262
1899	7,565,565	58,377,784
1890	12,949,157	75,053,768
1901	12,279,674	81,575,685
1902	15,727,932	64,675,523
1903	34,558,990	62,922,173
1904	19,447,258	67,886,083
1905	14,343,904	85,546,682

The American Belgian Chamber of Commerce has been organized in Chicago for the promotion of measures calculated to favor and develop the relations reciprocally between the United States and Belgium in literature, science, art, commerce, industry and finance. Temporary offices have been opened at 159 La Salle street. The following business men are among those interested in the organization: Enos M. Barton, president Western Electric Co., Chicago; Frank E. Tracy, vice president First National Bank, Springfield, Ill.; James A. Easley, Springfield, Ill.; E. P. Russell, Russell-Brewster & Co., Chicago; W. R. Goodwin, *Breeders' Gazette*, Chicago; A. Van Schelle; Chas. Henrotin, Belgian and Turkish Consul General; G. A. Spoor, president Union Stock Yards, Chicago; W. E. Skinner, general manager Union Stock Yards, Chicago; John S. Cooper, Julian Hillard, F. J. V. Skiff, G. E. Otis, Maurice Pincoff, Col. Chas. Mills, all of Chicago, and M. De Ridder, Belgian Consul, Louisville, Ky.

BUFFALO FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Buffalo Foundrymen's Association was held April 18 with President Lyman B. Hubbell in the chair and 27 members present. W. H. Carrier, associated with the Buffalo Forge Co., presented a paper on "Air Blast For The Foundry Cupola" for which a vote of thanks was tendered him. It was as follows:

Air Blast for the Foundry Cupola.

During the past year the subject of blast for the foundry cupola has been given considerable attention both by the Pittsburg Foundrymen's Association and by the American Foundrymen's Association. Relative to this discussion it may be of interest to consider certain investigations which have been made in this direction.

The foundryman about to install a blower for his cupola wishes to weigh carefully the relative merits of the fan and the positive blowers. The data to be considered in order of their importance are as follows: First: The relative advantages in operation; second: The relative efficiency, i. e. the relative power required for operation; third: The relative costs of maintenance; fourth: The comparative first cost.

Operating Advantages of Fan

The principles upon which these two types of blowers operate are quite different. The centrifugal blower furnishes a variable air volume at a contant pressure, while the positive blower furnishes a constant volume and variable pressure. Which method offers the greatest advantage in the operation of a cupola is still a matter of dispute among foundrymen. It is urged by the advocates of the positive blower that a positive air volume gives a greater speed of melting with less power for a given pressure. Others base their preference for the fan upon the claim that it is more elastic in its operation, giving a greater volume of air when most needed at the beginning and at the end of the heat and at no time forcing the cupola to an undue extent. It is maintained further that the fan has the advantages of permitting a complete control of the blast volume and pressure through the operation of the blast gate, a feature which is impossible in the positive blower without great waste of power. The expert cupola operator watches the speed of melting very carefully; and with the fan blast always has it under ready and perfect control. The melting capacity of the fan depends upon the inside diameter of the cupola and upon the pressure, while the melting capacity of the positive blower depends upon the speed. Thus it is common in fan practice to increase the melting capacity by increasing the diameter of the cupola inside the lining without changing the speed of the fan. With the positive blower, however, it would be necessary either to increase the speed of the blower or to install a larger size.

Flexibility of Fan Blast Saves Power.

An advantage is claimed for the positive blower in the consumption of power. Under certain conditions a slight superiority in power economy of the positive blower over the fan cannot be denied. Neither is mechanically perfect. In the former, loss of power and of air volume occurs principally through leakage of air between the contact surfaces of the rotary parts. There is considerable loss also due to the friction of the contact parts and of the gearing. The loss in power in the fan is due chiefly to the loss in pressure by friction of the air in passing through the blower. A new positive blower in good condition will give an efficiency of from 70 to 75 percent, while the fan as usually constructed gives an efficiency of only 60 to 65 percent. At a slightly increased cost, however, fans can be built giving not less than 70 percent efficiency, or practically, the same efficiency as obtained by the positive blower. The wearing of the contact parts in the positive blower causes a rapid decrease in the efficiency so that after some years' service its efficiency is frequently lower than that of the fan. While under ideal conditions the positive blower gives slightly better efficiency than the fan, yet under practical conditions of operation the fan usually proves superior, owing to the great flexibility of its blast.

An erroneous impression is often given as to the power required for fan blast, owing to the fact that very often fans are not properly proportioned for the duty required. The efficiency of the fan decreases when the fan is worked either above or below its rated capacity, although the change in power is not so great as with the positive blower. With the positive blower the power increases or decreases with the pressure, while with the fan, the air volume and the power are less as the pressure increases and grow more as the pressure decreases. On this account a fan frequently requires excessive power when proper attention is not given to the regulation of the blast, especially when starting the cupola or blowing upon the fire, and also toward the end of the heat when the bed of fuel becomes light. This subject was discussed by Mr. Thomas D. West in a paper read before the Pittsburg Foundrymen's Association, March 7, 1904. The great amount of power used by the fan which he cites was required when blowing up the fire before charging the cupola. Under these conditions the power required is 2 or 3 times that necessary under normal conditions of operation. As a motor was used the speed of the blower could not be changed, and the power should have been reduced by the use of a blast gate. In this connection, it should be stated that a cupola fan requires approximately seven times as much power when blowing freely into the atmosphere as when operated at the same speed with the outlet closed.

Lower Pressures Favored.

The writer believes the practice to be growing in favor among foundrymen of using lower pressures and larger tuyere area with the better distribution of blast. Under these conditions the advantages lie largely with the fan. As a comparison, a local foundry using a positive blower on a 60-in. cupola at 16½ oz. pressure requires 3 horse-power per ton of iron melted per hour, while in another case a fan operating a 66-in. cupola pressure requires 2¼ horse-power per ton of iron melted. The blower and fan were both new. It is also interesting to note that the former requires a ratio of 8 to 1 for melting, while the latter requires a ratio of only 10 to 1. The reason for this difference in melting ratio is shown, in part, by a comparison of the analyses of cupola gases. Gases from the first cupola gave the following analysis: carbon dioxide, 11.5 percent; carbon monoxide, 11.4 percent; oxygen, .5 percent; nitrogen, 76.6 percent; pounds of air per pound of carbon, 8.9 percent; heat units per pound of carbon, 9,200.

In the second cupola using a fan, the following analysis was taken: carbon dioxide, 15.1 percent; carbon monoxide, 8.7 percent; oxygen, .3 percent; nitrogen, 76.2 percent; pounds of air per pound of carbon, 9.4 percent; heat units per pound of carbon, 10,800.

From this it will be seen that 15 percent more heat was obtained from the fuel in the second case than in the first, which accounts in part for economy shown by the melting ratio. Unfortunately the temperatures of the iron, which are required to make the above data complete, were not taken, but it is believed that they were practically the same, in each case being sufficient for pouring a good grade of fine castings. The fact that there is a greater difference in the melting ratios than would be indicated by the gas analysis may be accounted for by the hypothesis that, owing to the more uniform distribution of the blast at a lower pressure in the second case, there was a greater concentration of heat and, consequently, a high temperature in lower part of the melting zone; while in the first instance with less perfect distribution of blast and with higher velocities, the melting zone was more extended and the temperature in the lower part less intense.

The combustion in the cupola is always imperfect. A large volume of carbon monoxide indicates a waste of fuel and a lowered temperature. It will be noticed that the combustion

This may be accounted largely from the fact that in the second case a certer tuyere cupola was used, which, with the low pressure, gave a very even distribution of the blast. It would appear that the proper distribution of the blast is the most important feature of cupola operation and effects the economy of fuel, the time of melting and the horse-power required in furnishing blast.

Fan More Economical.

The cost of the maintenance is perhaps about the same with either type of blower. With the fan the only cost of maintenance is that of replacing belting and re-babbitting of bearings, neither of which is required more than once in several years. Apart from this there is practically nothing about the fan that can wear out and impair the efficiency. With the positive blower the chief wear is in the contact surfaces which causes a decrease in the capacity and efficiency and finally renders the blower worthless. As the first cost of a positive blower is much greater than that of the fan, the loss through deterioration is consequently greater.

Melting Capacity.

A question of much importance is the melting capacity of various sizes of cupolas under different pressures and the corresponding horse-powers required for operation. As the result of numerous tests and considerable investigation, a relation has been formulated between the size of the cupola, the pressure of the blast, the average speed of melting and the horse powers required for operation. These data are given completely in the accompanying table. The figures on the left represent cupola diameters and those at the top, static pressure at the cupola in ounces per square inch:

TABLE OF CUPOLA CAPACITIES.

		10 oz.	12 oz.	14 oz.	16 oz.
30"	Cap.	5690	6230	6730	7200
	A. P. M.	423	1508	1688	1800
	H. P.	17.4	9.7	12.3	15.0
35"	Cap.	7740	8480	9170	9800
	A. P. M.	1935	2120	2293	2450
	H. P.	10.0	13.2	16.7	20.4
40"	Cap.	10120	11080	11970	12800
	A. P. M.	2530	2770	2993	3200
	H. P.	13.2	17.3	21.8	26.6
45"	Cap.	12810	14030	15150	16200
	A. P. M.	3203	3508	3788	4050
	H. P.	16.7	21.9	27.6	33.7
50"	Cap.	15810	17320	18700	20000
	A. P. M.	3953	4330	4675	5000
	H. P.	20.6	27.0	34.0	41.6
55"	Cap.	19130	20960	22640	24200
	A. P. M.	4783	5240	5660	6050
	H. P.	24.9	32.7	41.2	50.3
60"	Cap.	22770	24940	26940	28800
	A. P. M.	5693	6235	6735	7200
	H. P.	29.6	38.9	49.0	59.9
65"	Cap.	26730	29270	31620	33800
	A. P. M.	6683	7318	7905	8450
	H. P.	34.8	45.7	57.5	70.3
70"	Cap.	30990	33950	36670	39200
	A. P. M.	7748	8488	9168	9800
	H. P.	40.3	52.9	66.7	81.5

The diameter of the cupola given is inside the lining. The first figure gives for each size the capacity in pounds of iron per hour and is marked Cap., the second figure gives the cu. ft. of air per minute required and is marked A. P. M. The third figure gives the horse power required for operation of fan and is marked H. P. It should be noticed that the melting capacity increases at a much lower rate than the pressure, while the horse-power increases very rapidly with the increase in the speed of melting. For instance: A cupola 60-in. inside lining will melt on an average 11½ tons per hour at 10 oz. pressure with 29½ horse-power. The same cupola requires 16 oz. pressure and 60 horse-power to melt 12½ tons per hour.

Compound Blowers.

Some very interesting experiments have recently been made in compounding of blowers for higher pressures. The Buffalo Forge Co. is now constructing a compound blower which gives two pounds pressure per square inch. It has been found by tests that the efficiency of the blower is not affected by the pressure, so theoretically there is no limit to the pressure that may be secured. By sufficient compounding, a fan could be used as a substitute for an air compressor or blowing engine and efficiency as high as 70 percent secured. It is probable that great progress will be made in this direction within the next few years by the use of compound fans direct connected to steam turbines.

Those in Attendance.

W. H. Carrier, Buffalo Forge Co.
F. R. Dunn, American District Steam Co.
W. P. Taylor, Bingham & Taylor.
Henry W. Wendt, Buffalo Forge Co.
H. D. Miles, Buffalo Foundry Co.
T. L. Richmond, Buffalo Scale Co.
C. M. Greiner, Buffalo Pitts Co.
Edward Kener, Buffalo Co-Operative Stove Co.
John Dobbie, Dobbie Fdy. & Machine Co.
Charles P. Ernst, Chas. F. Ernst's Sons.
Lyman P. Hubbell, Fillmore Ave. Fdy. & Iron Works.
F. M. Fries, Fries & Co., Brass Foundry.
William Cullen, Frontier Iron Works.
H. D. Dixon, Gardner Foundry Co.
Lawrence Ginther, Washington Iron Works.
Gibson Howard, Howard Iron Works.
Joseph Kuhn, Kuhn Foundry Co.
J. J. Lawler, Lawler Iron Works.
William H. Barr, Lumen Bearing Co.
George Lautz, Niagara Machine & Tool Works.
T. J. O'Brien, O'Briens' Foundry.
Wm. F. Pohlmann, John W. Pohlman Foundry.
J. C. Bradley, Pratt & Letchworth Co.
E. D. McKenna, Standard Foundry Co.
L. C. Dodd, Snow Steam Pump Works.
Geo. D. Hayes, U. S. Cast Iron Pipe & Fdy. Co.
H. G. Trout, King Iron Works.
James Taylor, Snow Steam Pump Works.

Electric Light Plant for a Public Building.

As an example of an isolated plant in the center of a large city, the electric lighting equipment at Cook County court house, Chicago, is interesting, and particularly as it replaces a plant which had become obsolete. The experience of the engineers with the former plant put them in a good position to judge of the advantage of generating their own current. The fact that boilers are required for heating such a large building is an argument in favor of combining an electric light plant with this work, since the additional cost of the attendance required is not very great. The building is lighted by 16 arc lights and 2,300 incandescent lamps. The voltage at the switchboard is 125. The generating machinery consists of one 100-k. w. and one 150-k. w direct current, engine type, six-pole generators built by the National Electric Co., Milwaukee, direct connected to engine of the four valve, single cylinder type, the former running at 225 revolutions per min. and the latter at 200 revolutions per min. The engines are single cylinder with double slide admission valves and Corliss exhaust valves. The pressure of supply steam is 125 lb. per sq. in.

The new plant is an improvement on the former belt driven installation, there being now no appreciable noise or vibration, which is an important requirement of a plant installed in a public building of this nature. On several occasions the generators have had to carry a steady overload of 20 percent, which they have done very satisfactorily, without any sparking or the necessity of changing the position of the brush holder yoke. The engine room is conveniently located, being in the basement on a level with the street. The original installation is believed to have proved remunerative, since the engineers would hardly have recommended the installation of another plant, when the question arose whether it was better to generate their own current or to take it from a supply company.

The Northern Iron Co., Port Henry, N. Y., has leased the Chateaugay furnace of the Delaware & Hudson Co., at Standish, N. Y., and it will hereafter be operated on a more extensive scale. A new stack is to be built, a fourth stove is to be erected and other improvements made, which will increase the capacity of the plant to 200 tons daily. Low phosphorus pig iron will be manufactured. The improvements will cost about $100,000 and will require about five months for their completion.

TRADE PUBLICATIONS.

The Pittsburg Valve, Foundry & Construction Co., Pittsburg, has issued a new catalogue, 6 x 9 containing 154 pages, of the line of steam and hydraulic goods manufactured, comprising lines of valves and fittings for pressures ranging from 50 pounds per square inch to 1,000 pounds per square inch. The scope of the catalogue has been limited to articles, the dimensions of which are of importance to the engineer or master mechanic in laying out his work and the tables and data appended are most valuable, and after years of experience are those that have been found most serviceable in the company's shop and draughting room. The illustrations are numerous while the tables are of great value to every power plant engineer. This company is a consolidation of the plants of Atwood & McCaffrey, Shook-Anderson Mfg. Co., Pittsburg Valve & Machine Co., Ltd., pipe fitting department of Wilson-Snyder Mfg. Co., and the foundry of A. Speer & Sons. All of these plants have been centralized in one plant located at 26th street and Allegheny Valley Railroad.

A catalogue of the Rickards' steam engines, built by the Corliss Engine Works, of Philadelphia, describes in detail the product of the firm. The catalogue also makes an excellent showing of the capacity of the company for heavy machine work, engine repairing, etc. Some space is given to the description of the plant, the location, switch connection with railroad, tool equipment, and sizes of large tools and presses are enumerated. The firm has built Corliss engines from 1872.

A separator price list and a description of afeed water heater and chemical purifier come from Warren Webster & Co., of Camden, N. J. The first refers to the steam and oil separators shown in part 3 of the 1904 edition of the general catalogue. The feed water heater and purifier pamphlet forms part 2 of the general catalogue and some 40 pages are devoted to water impurities and improvement.

Bulletin No. 4 treats of the Vulcan shaking and dumping grates, boiler fronts and other castings made by the A. D. Granger Co., of New York. Grates of the Adams or diagonal opening type, saw dust grates, Tupper or herring bone grates, plain or straight bar grates, circulating grates, etc., are made in many sizes and with various widths of openings. Steel plate fronts for boilers are also illustrated.

The Western Iron Works, of Los Angeles, Cal., has a new gas engine catalogue. The Western gas engine is claimed to use heavy fuel oils as well as the light volatile fluids and "runs equally well without special apparatus and without generators, on gasoline, naphtha, benzine, distillates light and heavy, and kerosene." The present publication is known as catalogue B.

Catalogue No. 053 pertains to the noiseless conveyor manufactured by the C. W. Hunt Co., of West New Brighton, N. Y. It is pointed out that some of the equipment illustrated was not the ideal type. Mechanical methods for handling coal and ashes were adapted to existing buildings and in others was limited by the appropriation available. Power plants are not usually erected in ideal situations but are located where property can be purchased or made available and the coal handling machinery frequently requires to be complex to suit peculiarly unfavorable conditions and at the same time to obtain the greatest economy in the daily operation of the plant. The catalogue is profusely illustrated.

"Steelsects" is the title of a neat pamphlet from the Berger Mfg. Co., of Canton, O. The title is an abbreviation of "sectional cabinets made of steel." The company manufactures office furniture of all kinds in metal. Cold rolled and pickled steel, sheet brass or bronze, and malleable iron are the only materials used in their construction. Made in this manner they are unaffected by atmospheric changes, are not inflammable and are proof against vermin.

The Crane Co., of Chicago, has just issued an advance circular, No. 01, describing steam and oil separators. These are made in sizes from 1 to 30 in., in the following types: Horizontal, vertical, angle and distributing. This circular contains twenty-six 10½ x 13½ sheets, handsomely illustrated from halftone engravings.

The National Electric Co., of Milwaukee, sends the second issue of its catechism. This will be issued as a serial, and by presenting it in the form of questions and answers, it will thus give, in a very condensed way, a maximum amount of such information concerning the technical applications of direct and alternating current electricity, collected from the most recent sources of literature and practical experience, as will be useful, not only to the layman and practical engineer, but also to the technical engineer as the subject develops. The numbers are sent free of charge.

Dodge & Day, of Philadelphia, have in bulletin 175 a comprehensive survey of their methods and results. The firm specializes in industrial engineering and an outline is given by diagram and in other ways of the system involved from the clients' orders to the completed commission. Views of the Jeanesville Iron Works Co.'s plant, at Hazleton, Pa., are shown before and after taking Dodge & Day treatment. The difference is a striking one. The firm has a number of pamphlets worthy of careful perusal by manufacturers.

The latest catalogue from the Pedrick & Ayer Co., of Plainfield, N. J., deals with compressed air appliances and railroad special repair tools. A number of improvements have been made in the latter equipment with a view to increased utility, but no radical change has been found advisable. The line of riveters has been redesigned throughout and the air hoists have been modernized. Ample choice is provided for the purchaser of hand and pneumatic cranes.

The new catalogue, No. 9, of the Wilmarth & Morman Co., of Grand Rapids, Mich., presents an attractive display of the "New Yankee drill grinder and other good tools." The publication starts out with a workmanlike array of facts about the usefulness of correctly-cutting drills. The utility of the drill grinder and the selection of a machine are in turn handled appropriately. The catalogue illustrates other tools, such as reamer grinders, arbor presses (shod with wood to protect the ways of the lathe), friction countershafts, etc.

A circular of skylights and side-lighting systems is from Arthur E. Rendle, of New York. He has recently patented a ventilating skylight. This is constructed similarly to the skylight previously made by this manufacturer and has steel channel bars, sheet metal caps, etc., but the channel bar sides have ¼-in. ventilating holes every 3 in. and these are also put through the top of the caps. The combination is said to shed water perfectly and ventilate at the same time.

The April number of *Graphite* is an augumented issue containing a variety of interesting features not usually found in this publication. To those interested in the uses of paint it would be well to send for this issue. It is abundantly illustrated with half tone drawings of various structures, including railway bridges, office buildings, grain elevators, mining and melting plants, terminal stations and other structures whose excellent condition testifies to the serviceibility of Dixon's Silica graphite paint. The number is well worth writing for and it will be sent to anyone upon request.

The *Progress Reporter* of the Niles-Bement-Pond Co., of New York, is a publication issued every few weeks to keep the employes of the firm and the public generally informed as to the new machines brought out. Locomotive manufacture is the subject of the latest publication along this line and the story is mainly told by full-page, 9 by 12-in., halftones, of fine quality. These depict machines at work in prominent plants.

The Reliance Machine & Tool Co., of Cleveland, manufactures bolt cutters, pipe threading machines, die heads, dies and taps, etc., and has a catalogue descriptive of these. It is well illustrated and there are a number of useful reference tables.

LAKE SUPERIOR IRON MINES.

In a short time the Oliver Iron Mining Co.'s Regent mines, at Negaunee, will be equipped with an underground electric haulage system. Its installation will likely be started within the next month or so. The improvement will greatly facilitate the handling of ore and will enable the management to increase the output. The present tramming system is one of the most successful of its kind on the range, but the haul in the main drifts is too long for the men and mules.

A new electric haulage system will also be installed at the Negaunee mine operated by the Cleveland-Cliffs Iron Co. The system will cover 3,000 ft. of tramways.

There has been much change in the trackage arrangements of the two Steel Corporation Minnesota roads this spring, in order to allay the pressure of business on the Duluth, Missabe & Northern and let the Duluth & Iron Range take up part of it. The latter road will now handle all Mesabi ore from points east of Mountain Iron, except Virginia. It will also handle, as usual, all from the Vermilion range. The Duluth, Missabe & Northern will be extended to the Mississippi river and will have all Steel Corporation ore from every point including and west of Mountain Iron, except such as the Great Northern may handle under its contracts. Both the two Steel Corporation roads have much ore from independent mines.

Subsidiary mining companies for the U. S. Steel Corporation have been organized as follow: Neville, Monongahela and Lorain, each with $50,000 capital, and each with Messrs. T. F. Cole, J. B. Cotton and G. D. Swift as incorporators.

The first shipment of ore to docks at Marquette was on April 7. There is much ice in Marquette harbor, and the whole eastern end of Lake Superior seems to be filled with ice fields of much thickness.

The South Jackon, recently bought by the Cleveland Cliffs Co., is to resume shortly. It is a lean ore proposition and the working force will be small. This is the only part of the Jackson properties that has been active in years.

The Cleveland firm of Pickands, Mather & Co., the most active of all independent ore miners and explorers at the present time, is to sink several holes near Negaunee, Mich., on lands under option to it. The Minnesota firm of Cole & McDonald will do the work and is now moving its drills to the location.

M. A. Hanna & Co., of Cleveland, as the Consumers' Ore Co., have begun work at the Richmond mine, Cascade range, Mich., a lease on which they bought last year from A. Maitland, of Negaunee. A crusher will be installed and much ore mined this year.

The car yards at the Adams mine, Eveleth, are being increased by the addition of room for 1,500 cars, indicating to some extent the expected additional business this year. This mine is now shipping from shafts. At the Fayal, directly adjoining the Adams, they are outfitting their shovels, and will be stripping in a week with three or four machines, on the large Drake & Stratto job, which has been under way for the past two years.

Stripping at the Pillsbury mine has commenced, and is under way with one shovel. The mine will be worked this year underground as well as by milling pits. Some 1,200 men are now employed at this mine and those immediately adjoining, the Glen, Clark and Chisholm, and all of them are working very heavily. There are large stock piles at the Glen and Chisholm.

The Taylor Coal & Coke Co., recently incorporated, with principal office at Uniontown, Pa., has purchased 800 acres of coal in Menallen township, near Uniontown. The company proposes to develop this property and build at least 500 ovens as soon as possible. The Bourne-Fuller Co., Cleveland, will act as exclusive selling agent.

THE PAINTING OF STRUCTURAL WORK.

BY HOUSTON LOWE.

When we were young in the paint business we fancied that if we could produce good material we would have no special troubles with it. However, experience soon dispelled this illusion and taught us that there are other things than the quality of the paint which affect the results to be obtained from its use. Substantial progress in the making and use of preservative and protective coatings for structural materials can only result from interchange of thought and experience on the part of all those interested in their maintenance. From our standpoint the following factors affect results in painting, viz.:

1. Location of the structure, e. g., seaboard or inland.
2. Kind and condition of the surface.
3. Quality of the paint.
4. Workmanship of the painters.
5. Number of coats applied.
6. Amount of time allowed to elapse between coats.
7. Atmospheric conditions when the painting is done.

Location of Structure.

Whether a paint is made to dry by oxidation, by evaporation, or by both, naturally there is a difference in its drying when used in the damp, saline atmosphere of the seashore or in the dry highlands of the interior; when used on the coast of the Gulf of Mexico or in the colder States of the North; when used in the pure air of the country or in the vitiated air surrounding structures in many towns and cities. Not only is the drying of paint affected by the location of the structure upon which it is used, but its working properties and durability as well. The viscosity of oil and varnish being affected by temperature, they will work more easily in warm climates than in cold. The durability will always be impaired by alternate exposure to wind and water; by exposure to sunshine and rain-fall; deleterious gases, vapors and liquids; dampness, darkness, mechanical injury, etc.

The paint for the finishing or top covering of any structure should be made to meet the special conditions of exposure to which it is to be subjected. Competent paint-makers can readily make protective coverings to withstand any reasonable condition of exposure and use, but in order to do so, obviously they must know the conditions. We were recently called upon to make for a prominent railway system a steel tank coating to be used near the Gulf of Mexico. The engineer in charge informed us that there was so much water of condensation on the surface of the metal most of the time that it was only possible to paint between the hours of ten in the morning and three in the afternoon, and that he had to have a paint that would set (not dry and harden) in two hours, otherwise it would be impossible to secure fair adhesion. It was possible to make a paint to meet this condition. Had we not known the condition, anything sent at haphazard would undoubtedly have proven a failure.

Kind and Condition of the Surface.

Absorbent brick, soft lumber, corroded iron or a rough surface of any kind will generally require a paint with a larger proportion of liquids to solids than hard lumber, clean steel, tin, etc. In one case the paint will be more or less rooted into the material underneath, and in the other it must be held almost wholly by surface attraction. Lumber contains water, sap, ligno-cellulose, and mineral matter. The two former are repellent of paint. As a rule, the heart wood of trees is more receptive to paint than the sap wood, a notable exception being yellow pine, the sap wood of which costs less than the heart and takes paint better; therefore if protected by paint it will last longer in frame buildings. The railroad people who are progressive have found this out, and are rapidly substituting sap wood for heart wood in freight car construction. We are surprised to learn that many reputable architects in

*Read before the Engineers' Society of Western Pennsylvania, April 18, 1905.

the Southern States still specify the heart wood of yellow pine for siding upon houses of the best class. It is unfortunate that there seems to be a lack of understanding upon the part of educated men of the close relation which paint must bear to the surface which it covers, e.g., the wood, and the importance of specifying lumber that paint can stick to. There are said to be thirty-nine varieties of pine in the United States and numerous species of poplar, hemlock, cypress, etc., so that one can see that it is easier to design a paint for coating iron or steel than it is for coating wood. It may be a good idea to use common lumber or seconds for weatherboarding and then try to save it or hide it with paint, but we question the economy of it.

With metals, when their temperature is less than that of the surrounding atmosphere, more or less sweat or water of condensation will always be found upon them. This is repellent of paint, as also would be any grease that might in any way get on the surface. In other words, paint will only stick well to a receptive surface, and a warm and dry surface will certainly hold paint better than a greasy, cold or damp surface. It will also be noted that some metals not only hold paint better than others, but they also affect it differently. Paint does not adhere well to metallic zinc or galvanized iron. A paint spread upon clean metallic lead will dry much more quickly than one spread upon clean steel. On the other hand it will wear longer upon steel than it will upon metallic lead.

Another point regarding surfaces is that rough surfaces hold paint better than smooth, and a paint upon rough surfaces seems to wear longer. The only reason for this phenomenon is that on a rough surface you get a greater thickness of layer than you do upon a smooth surface with the same number of coats.

The sand blast offers a rapid, efficient and economical means of cleansing steel and putting its surface into a receptive condition for paint, and we fancy that it will not be long until architects, engineers and builders will realize that it is just as important to have sound, clear and dry lumber to hold paint as it is a clean metallic surface.

Quality of the Paint.

The quality of any paint depends as much upon its physical characteristics as it does upon its chemical composition. With two linseed oil paints that will show the same qualitative and quantitative analysis, the one of the greater viscosity will be the slower drying and the more durable of the two. This is because it will form a skin upon the surface that will be thicker and more impermeable to water and gases than the thinner paint. The corrosion of steel, the decay of wood, and the deterioration of paint are practically due to one and the same cause, viz., the combined action of carbon-dioxide and moist air. Therefore that paint or coating will give the best protection which will be least affected by and is the most impermeable to a combination of these two things.

To understand the nature of painting, we will first take up the subject of linseed oil, which, after centuries of use, today remains, from the standpoint of durability and drying, the best thinner we have for painting. Linseed oil in drying changes first into a sort of jelly and then into a solid leathery or rubber-like substance which Mulder named "linoxyn." This linoxyn is a wonderfully tough and durable substance. However, when linseed oil is spread upon a smooth surface, without the use of pigment, the skin formed will be less than 1-1,000 in. in thickness. Further, the skin so formed will be pervious to moisture. Pigment is therefore added to the oil for paint making, first for the purpose of thickening the skin formed, and second for the purpose of making the skin impervious to moisture. Dried paint may be looked upon as a fabric in which linoxyn is the chain and pigment the filler. Linoxyn is not quickly formed from linseed oil without dry air and light, but when once formed is much more stable and much better able to resist atmospheric influences than linseed oil itself. In other words, wet paint is much more sensitive than dried paint. A fair quality of linseed oil when spread out in a thin layer on a smooth surface under favorable conditions requires from five to seven days to dry and harden. As this would be too slow for practical purposes, paintmakers and painters either add to the oil some pigment that will react with it to hasten drying, or they add to it some oxidizing agent like japan or some diluent like spirits of turpentine or petroleum naphtha, the two latter only serving as volatile extenders that more or less interrupt the continuity of the resultant film. So many books have been written on the subject of linseed oil that we will not take time to discuss its nature and characteristics.

From the practical standpoint, pigments may be divided into two general classes; first, those that react more or less with the binder, notably the carbonates and all lead compounds; and second, those that have no chemical action upon the binder, i. e., are inert, such as graphite, lamp black, barytes, silica, and sometimes ferric oxide, etc. Those of the former class produce the better drying and less durable paints; those of the latter class produce the slower drying and more durable paints. We work upon the theory that under coats should dry more quickly and harder than those above them, and that the difference in drying between adjoining coats should not be very great. On this theory, where best results are desired, we always recommend the use of red lead paint as a foundation coat on naked steel, and white lead paint as a foundation coat on bare wood. For the middle coat, where conditions will permit the use of three kinds of paint, we recommend the use of a paint made from about equal proportions of active and inactive pigments with linseed oil. For finishing coats we always recommend the use of paint made from inactive or inert pigments with linseed oil. Amongst the best of this class may be noted graphite, charcoal, oxide of iron, powdered mica and aluminum. The pigments named in this class are more stable and weather-resisting than linoxyn, therefore in the use of them you will find that the thicker your paints are the more durable will be the films resulting from their use when spread out in thin layers on steel. On the contrary, where durability is desirable, with active pigments like white lead, zinc white, etc., which are more affected by atmospheric influences than linoxyn, you will find that the thinner you use paints made from such pigments, consistent with fair covering of the surface, the better they will wear. On general principle or as a common law, we would state the proposition as follows, viz., where inert pigments are used with linseed oil the thicker your paints are, consistent with proper spreading under the brush, the better they will wear, and as a corollary to this, thin coatings, especially top ones, of paints made from pigments like white lead, chrome yellow, etc., will wear better than thick ones. You have doubtless noted how much better common paint, made from dull inert pigments, wears on freight cars, barns, bridges, etc., than more delicate colors, made from active pigments like white lead, etc., wear on line cars, frame houses, and structures of that class.

Workmanship.

A good painter will often get better results with a fair paint than a poor workman will get with a praiseworthy one. The method of application is about as important as the quality of the paint used, for the reason that a layer of air and the water which it may hold exists upon all surfaces. This layer of air prevents close adherence of the paint to the surface and it can only be gotten rid of by thoroughly brushing the paint out on the surface and into the body of the material underneath.

A distinguished British painter and author writes: "The less paint that is put on at each operation consistently with a proper covering of the ground, the better will the ultimate result be." "Less paint and more painting," he impresses as a need "to quite 90 per cent of his painter students." The personal equation always counts in painting as it does in almost

everything else. From experiments with an ocular micrometer in connection with a microscope, we find that single coats of the same paint may vary in thickness from 1-500 to 1-1000 in. The variations in thickness from these extremes and intermediate points are due to the varying pressure of the brush under the hands of the painter. Much of the poor work done nowadays results from the quality of the tools purchased by or supplied to the painters. We insist that a good workman to do good work must have good tools to work with; that is, brushes not over 3½ in. wide and full or thick with good stiff bristles. For the highest class of work we prefer what they call down East "pound brushes"; that is, round brushes with good stiff okatka bristles in them not less than 6 in. long. With one of these properly bridled, a painter can do more and better work in a day than it is possible for him to do with the ordinary flat brush that is usually furnished him and which costs little less. The good workman will always pay especial attention to the coating of edges, and those parts of a structure where water and dirt will lodge, and to the filling in of all crevices, beads and mouldings to prevent the incursion of water. These hidden parts are often the vital ones in bridges or in buildings of steel cage construction and they are those which should have the most vigilant and constant attention.

The Number of Coats.

The durability of paint will be affected by the number of coats applied; that is, two coats of paint will wear better than one; three coats of paint will wear better than two; and four coats of paint will wear better than three. The theory upon which we design coatings both for wood and for metal is that the primer or foundation coat should be considered as structural material whose function is both to exclude air and moisture from the material underneath it and to form a receptive surface for subsequent coats. It is further our theory that in the sequence of coats this primer or foundation coat should dry more quickly and harder than any one covering it.

Where it is desired to finish a structure in white, or in a light tint composed largely of a white pigment, we have reason to infer that it is wise to limit the number of coatings applied to three, exclusive of the primer; the reason for this limitation being that our knowledge includes no inert pigment which when used alone with linseed oil will have sufficient hiding power to serve as a satisfactory paint pigment. The consequence is that to produce a good paint in white or some light tint, it is necessary to use pigments like white lead or zinc white that react with the oil and continuously weaken it until its power as a binder is finally destroyed. With paints made from inert pigments and linseed oil it is undoubtedly true that, provided a sufficient interval be allowed to elapse after each coat for it to dry and harden, the greater the number of coats and the greater the total thickness of the layer, the greater will be the degree of impermeability to air and moisture, and also the greater the degree of resistance to atmospheric influences.

Andés, in his work on "Anti-Corrosive Paints," says: "It may be laid down as a normal standard that—presupposing the use of good paint—one bottoming coat and three subsequent coatings, laid on at suitable intervals, will be required to produce a layer of oil paint of sufficient thickness on iron to keep moisture away from the metal and to protect the latter from rust for a certain time."

Time Between Coats.

Linseed oil in drying takes something from the air, viz., oxygen, and gives off something to the air, viz., carbon-dioxide and water. Mulder describes the process beautifully and calls it "the breathing of the drying-oils." The things favorable to the drying of oil paints are light, pure, dry air, and moderate artifiical heat. The things unfavorable to the drying of oil paints are a humid atmosphere, darkness, noxious gases, and low temperature.

The amount of time which should be allowed to elapse between coatings of any given oil paint will vary so much with the location of the structure, the kind and condition of the surface, the quality of the paint, the atmospheric conditions when the painting is done, and for the first few days after it is done, that it is obvious no set period of time can be named. However, a painter who is interested in his work can always determine whether one coating is fit to receive another by noting its luster, the time when the paint no longer sticks to the dry skin of the finger, and the time when the layer cannot be moved under heavy pressure. Blistering, cracking and peeling of paint are often due to the fact that under coats were too elastic when they were painted over. If a piece of work be painted coat upon coat of oil color before each coat is sufficiently dry, the movement and shifting of the under coats in their effort to obtain oxygen for their proper hardening will either rupture, i. e., crack the top coats, or lift them up in the form of blisters. Pearce in his excellent book on painting says that four days is not too much to allow for the proper drying of oil color which will nominally dry in twenty-four hours. The period may be shortened by additional dryers, but a good rule is to allow all paint to stand four times as long as it takes to arrive at superficial dryness.

Atmospheric Conditions when Paint is Applied.

Opinions as to the best time for painting differ largely, but nearly all the standard authorities concur in the opinion that a temperature of from 55 to 80 deg., and an atmosphere that is as free from moisture as possible, favor the best results.

The atmospheric conditions vary so widely in different localities throughout the country that the student of painting can only reasonably draw inferences as to methods of securing the best results by close observation and persistent experimenting under as widely varying circumstances as possible. For instance, a certain paint would dry under average conditions in our laboratory in about five hours. The same paint out of doors under varying conditions dried as follows, namely: Feb. 5, in dry weather, temperature below zero, in 26 hours; Feb. 28, in dry weather, temperature about 50 deg., in 4 hours; March 7, in rainy weather, temperature about 60 deg., in 22 hours; March 8, in damp weather, temperature about 36 deg., in 14 hours.

It is our opinion that in painting it is always especially important to note the weather conditions the night before the painting is to be done. In the examination of reported failures of paint, experiences has emphasized the relation of durability to atmospheric conditions, requiring a careful record of the weather the night before and the night after the work was done. Sweat, or water of condensation, will always be found upon steel when its temperature is lower than that of the surrounding atmosphere. Simon made observations in the softening of paint by dew on the iron-work of bridges, the result being the formation of rust; he expresses the opinion that rusting is not attributable to the iron's having been insufficiently cleansed before painting, but rather to the deposition of dew soon after the painting was done, the result being rapid cooling of the metal, the liquid being then absorbed by the paint and brought into contact with the iron, which is thereby rusted.

Tanks, towers and tubs in great variety are made by the W. E. Caldwell Co., of Louisville, Ky. Some idea of the scope of this company may be seen in the statement that latticed column steel towers with hemispherical bottom tanks of steel are built in any height to 150 ft. with tanks up to 200,000 gallons capacity. The 27 years experience of the firm are epitomized in the 1905 catalogue. The space is too limited for more than a brief reference to the extensive enterprise—over 400 sectional steel towers are doing duty in the state of New York alone. Additional literature on tank construction, illustrations of representative illustrations, etc., is for distribution to those interested.

THE ENGINEER AND HIS EDUCATION.

Tredgold defined engineering as the art of directing the sources of power in nature for the use and convenience of man. Engineering includes the science and art of construction in general. The civil engineer designs and constructs docks, harbors, canals, dams, water power and water supply plants, sewers, roads, railroads, bridges, foundations and structures of masonry and of iron and steel. The mechanical engineer designs and constructs and equips and manages factories and power plants; designs and constructs engines and machinery. The electrical engineer designs and constructs electrical machinery; designs, installs and manages electrical power and lighting plants, telegraph and telephone installations, etc. A well educated and experienced engineer is not a skilled workman or artisan, but he is a man who knows how the artisan should do his work; he originates the plans for the work and he can advise the capitalist whether or not a proposed piece of work should be undertaken. He prepares instructions for a survey; instructs draughtsmen how to make a design, writes specifications for contracts, selects the kind of material and machinery best adapted for a given purpose, engages assistants, superintendents and foremen; writes prospectuses and financial statements. Such a man gets a part of his education in the engineering college, but the greater part he gets in the school of experience.

The average student, in order to graduate, must make up his mind to spend at least nine or ten hours a day in study, in work in the shops, drawing rooms and laboratories and in the lecture and recitation rooms. Many young men make a mistake in coming to an engineering college, and they don't find it out until well along in their course. Many come imperfectly prepared, and their courage in entering, handicapped with conditions, is more commendable than their judgment. But to the student who, whether entering with conditions or not, begins his work with a sound body and a sound mind, with an honest intention to do his utmost to succeed, only the heartiest encouragement should be given. Many of the best engineers are those, who, after graduating, took an apprenticeship course in some factory, where they made not over $10 or $15 a week for the first two years. The further progress of the young graduates depends not only upon how good students they were in college, but also on their other qualities: perseverance, industry, pluck, tact, and the art of making friends, as well as upon their actual achievements in practice and the good will of their employers which they gain therefrom.

It is only within the last 30 years that men have found how to educate brain power in the most economical manner so as to make it capable of producing the great results of an industrial and economical revolution. This utilization of the forces of nature is the work of the engineer, and the training of the engineer in the most rapid and scientific manner is the work of schools of applied science of engineering schools. Thirty years ago there were not over half a dozen of such schools in the country, and they turned out on an average probably not as many as 20 graduates in a year. There was then no great demand for them, but within the next 10 years, when several hundred of such graduates had shown what results they could achieve in practice, often before they were 35 years of age, the public began to understand what an engineering graduate was and soon there was a ready and ever growing market for his services. The demand for such graduates has been met by the organization of a hundred or more engineering colleges throughout the country, many of them as departments of universities. There are now probably not less than 15,000 students in these colleges and the number is increasing rapidly.

The prospects of large financial success of the engineering graduate are the same as those of the graduate of the college of medicine or of law. The great prizes are only for the few. A comfortable maintenance is for the majority, and the failures are no greater in number than in the other professions.

An interesting exhibit of what 100 picked men between the ages of 27 and 43 in the electrical engineering business have done is given in a paper by George A. Damon, entitled, "The Opportunities in the Electrical Business," read before the electrical section of the Western Society of Engineers, March 18, 1904. Mr. Damon sent a letter of inquiry to 100 of the leading men in Chicago engaged in the various branches of the electrical industry. The summary of the results of his inquiry is as follows: Young men control the business. The inquiry was therefore confined to men between the ages of 27 and 45 on the theory that the older men are the product of a set of conditions that have passed away, while the youngest men as a rule are still engaged in a period of preparation. Classified in reference to incomes, the record is as follows:

Income over $10,000 per year	5
Income between $5,000 and $10,000	9
Income between $2,400 and $5,000	66
Income less than $2,400	20
Total	100

The average age was 33½ years and the average income, $3,440. Seventy-five percent of these men are college graduates. The average age of 20 men who are succeeding without a college education is 36 years, and their success measured by a monetary standard shows an income of $3,670 a year. The average age of 16 graduates of one university is also 36. Their average income is $4,940, which shows a balance of $1,270 a year in favor of the college education. Mr. Damon says that there are in Chicago at least 100 more men whose incomes will average about the same as the first 100 selected. An effort was made to make the list representative and the men were selected on account of their positions without reference to their incomes.

It is to be observed of course that these are leading men. Nothing is said about the vastly greater number of men who are not leading, but there is no reason why an engineering graduate who has shown himself able to stand the severe four years' course in an engineering college, and also has the qualities other than those of scholarship which go to make success in business life, should not become a "leading man" within 10 or 15 years from the date of his graduation.—[William Kent, Syracuse University, Syracuse, N. Y.

The lowest bid for the three scout cruisers opened at the navy department last week were from the Fore River Ship Building Co., Quincy, Mass., which proposed to build one at $1,629,000 or two at $1,557,000 each. The lowest bids submitted for cruisers with turbine engines were from the same company which offered to build two at $1,468,000 each.

The first visit of Fred C. Gedge to Anderson, Ind., as manager of the mills of the Chicago district of the American Steel & Wire Co., to which position he was recently promoted, was made an occasion of a banquet tendered him at the Grand Hotel by officers of the Anderson plant of the company and other Anderson friends of Mr. Gedge. W. C. Stone, assistant manager of mills of the Chicago district, acted as toastmaster, and a number of responses were made. The banquet was concluded by all singing My Old Kentucky Home, as suggested by Mr. Gedge's native home.

The Phoenix Bridge Co., of Phoenixville, Pa., is now completing plans for the largest steel span bridge in the world, which is to be erected over the St. Lawrence river near Quebec. The cost will be $3,800,000. The material will be furnished by the Phoenix Bridge Co. The bridge will be 2,800 ft. long between centers of anchorage piers, the superstructure to weigh 40,000 tons.

STATUARY BY THE "CIRE PERDU" PROCESS.

James Barnes has written for *Collier's Weekly* an enthusiastic discussion of the statuary modeled by Frederick Remington. Mr. Remington has produced some striking effects in bronze and the glowing description of his work in the "lost wax" process, as it appears to Mr. Barnes, will be found entertaining. A few extracts are here reprinted:

"The original model is generally done in a waxy preparation called plastaline, which the artist may work to any degree of finish he may desire. From this model a plaster cast is made, and thus the first replica of the original (which is cut up and destroyed in the process) is secured in a more lasting material. From this a set of mold sections is now made in glue or gelatine. These soft molds are dissected into pieces of such size as the necessity of broad handling or delicate workmanship may demand. Of each piece a plaster cast is taken and the glue mold is lost.

"In the third part of the process these tightly fitting little puzzle-blocks of plaster are united so as to form different mold portions of a statuette. Hot wax is now carefully painted with a brush inside of the sections to a thickness which the bronze will subsequently take in the final casting. The inside surfaces having been oiled, the wax impressions can be easily removed when cooled, and the several pieces joined by the application of heat at their points of juncture; and slowly another replica of the original plastaline model is formed in hollow wax. Here the artist again begins to work.

"With the apparently fragile shell before him he can take liberty. He can paint upon it with a brush dipped in the molten wax; he can smooth away with a scapula any ridge that does not strike his fancy; he can change the swing of a horse's tail, or gently alter the position of a lifted forefoot. The hollow model is his, and he can enjoy once more the thrill of creative composition! Thus each piece is given an individuality soon to be duplicated in enduring metal.

"The wax model is handed over to the care of a skilled artisan again, and before long it would hardly be recognized. From various points, stretching upward and downward, grew little twigs and tentacles of wax, all joining at the top. The little figurine seemed caught in some strange herbaceous growth but every tentacle had its use. Remember, the wax is yet hollow—a mere shell; but now into an opening is poured a substance that will fill every nook and cranny of the hollow image and harden there. Then around the outside is poured the same easily flowing material, and it follows all the curves and hollows, as it did inside. Now the wax tendrils have become, in the parlance of the molder, 'channels,' 'gates,' and 'cores,' and the whole is resolved into a shapeless mass that portrays nothing of the delicate wax shell within it. Over all this is poured another heat-resisting substance, and finally the whole is placed in the oven. The wax melts and runs out from the 'gate' at the bottom, leaving a hollow space between the inner and outer matrix, which are kept apart by little bolts of bronze. This mold is now carefully banked in a sunken pit, for should moisture or wax remain and steam be formed, an explosion might occur as the molten bronze is poured into the delicate shell. All has gone well, however, and, after being allowed to cool, the now disintegrated matrix is removed, and here is our bronze figure before us, wrapped in a labyrinth of metal vines this time. These are filed and cut away, the gold color of the metal is toned by chemicals, the appurtenances are added—a bridle, a quirt, a coiled lariat—and the bronze statuette is finished.

The Hartford Machine Screw Co., Hartford, Conn., recently purchased by the Standard Screw Co., of Detroit, has been formally reorganized. Officers were elected as follows: President, W. B. Pearson; vice president and general manager, Philip B. Gale; secretary, John W. Morrell; treasurer, Joseph W. Lanman

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers:—

Articles of incorporation of the Gold Separator Mfg. Co., Helena Mon., have been filed with the Secretary of State. The company is formed for the purpose of manufacturing the Bloom dry separator for the extraction of gold without washing. The incorporators are: F. O. Bloom, F. M. Brown, T. C. Bach and Ira T. Wight, all of Helena. The capital stock is $25,000, of which $17,520 has been subscribed.

New England Granite Machine Co., Boston, has been incorporated with a capital of $200,000. President, Leonard W. Ross; treasurer, Frank P. Barnard.

William Allen Son's Co., Worcester, Mass., has been incorporated to manufacture machinery. The capital stock is $20,000. Wm. Allen is president and Walter B. Allen treasurer.

The Atlas Wire Co., South Bartonville, Ill., has been incorporated with a capital stock of $100,000. The object is to do a general manufacturing business. The incorporators are: P. W. Sommer, J. W. Sommer and B. L. Sommer, who are also interested in the Keystone Fence Co. The plans of the new company are not yet made public, but the erection of a factory of huge dimensions is contemplated.

The Rapid Ratchet Works, Chicago has been incorporated to manufacture machinery. Capital, $25,000; incorporators, John Konar, Reginald I. St. Peters, James G. Brown.

The American Engineering Co., Indianapolis, Ind., has been organized by business men of that city. The capital stock is $300,000. The company will build electric and steam railroads, bridges, elevators, mills, mining, gas and telephone plants. The directors are: August M. Kuhn, Fletcher S. Hines, Amos K. Hollowell C. N. Wilson, E. W. Barrows and E. W. Abbott.

The Auburn Iron Co. is the name of a new firm which has been recently incorporated to do business in Auburn N. Y. The firm is composed of C. Eugene Almy, for a number of years superintendent of the malleable shops and rolling mill of D. M. Osborne & Co., and former city clerk Edward H. Herrling. The company will deal in bar iron and steel, new and old iron and steel. The location of the plant has not been definitely decided upon. The capital stock is $5,000.

The Gardner Machine Co., Beloit, Wis., recently incorporated, held a meeting April 8 and perfected the organization. The stockholders elected five directors, as follows: F. N. Gardner, W. H. Grinnell, N. J. Ross, P. B. Yates, Lou Raubenheimer. After the adjournment of the stockholders' meeting the newly elected directors organized and elected F. N. Gardner president and general manager of the company, N. J. Ross vice president, W. H. Grinnell secretary and treasurer. As soon as a building and equipment can be secured, the company will enter upon the manufacture and sale of machinery and tools, notably those heretofore invented and put upon the market by F. N. Gardner.

Notice has been published that application will be made for a charter of an incorporation to be called the Urick Foundry Co., Erie, Pa., for the manufacture and sale of casting from iron or steel. The following persons are interested: Chas. H. Urick Sr., F. H. Dixon, Wm. J Urick, Chas. H. Urick Jr and Earle A. Urick.

The Meriden Firearms Co., Meriden, Conn., has been organized with a capital of $175,000. The concern has elected the following officers: President, Fred Biffar of Chicago; vice president and general manager, A. J. Aubrey of Meriden; secretary, A. H. Loeb of Chicago; and treasurer, F. A. Stephani of Meriden. The company has taken over the plant of the Meriden Malleable Iron Co., which is being rapidly

fitted up and equipped. Part of the plant is already in operation with about 300 employes at work.

The Thole-Phillips Mfg. Co., Florence, Ala., has been incorporated with a capital of $50,000. The concern will manufacture both cooking and heating stoves and make various kinds of castings, including house fronts. It will also manufacture hay presses and agricultural implements.

The Pollock Automatic Wrench Co., Galesburg, Ill., has been incorporated with a capital of $25,000 to manufacture mechanical devices. The incorporators are: Charles V. Pollock, E. B. Hardy and J. J. Welsh.

New Construction :—

The Lane Tool Co., Cleveland, will build an addition, 53 x 120 feet, one story, to be used as an erecting shop.

The Variety Iron Works, Cleveland, have obtained the contract for the iron and steel construction of the blast furnace to be erected at Cadillac, Mich., by the Mitchell-Diggins Iron Co.

The plant which the Worcester Pressed Steel Co., Worcester, Mass., will erect will be 200 x 90 ft., two stories. The second story will be of gallery construction; the office section three stories, brick and wood, largely glass, monitor roof. The building will require trolley track two-ton electric crane, 30-ft. span; annealing furnace, cold rolling mill, sheet shear, new presses, 150 h. p. gas engine or steam plant, dynamos, motors electric lamps sprinkler system, elevators, etc. The entire plant will be operated by electric transmission, three wire system. The building will be done in July.

The old plant of the Fountain City Drill Co., La Crosse, Wis., recently leased by the Summit Stove Co., is being remodeled and enlarged.

The new plant of the Tennessee Stove Works, Chattanooga, Tenn., has been completed, and the first stoves were made this week. The new plant consists of three substantial brick buildings, electric power plant, stock and finishing, and foundry departments. The electric power plant will have a capacity of 80 h. p., and an engine made by the Harrisburg Foundry & Machine Works, Harrisburg, Pa., has been installed. The foundry building is 165 x 125 ft.

The foundation has been completed for the building of the Buckeye Fence Machine Co., Ashtabula, O., and the work on the superstructure, which is to be of concrete block, is well under way.

The plant of the Bullock Electric Mfg. Co., Cincinnati, is to be enlarged to nearly double its present capacity. The following improvements have been determined upon, in addition to those that are now under way: The foundry is to be extended 100 ft. and made double its present capacity; a system of compressed air will be installed for chipping castings, and extra cupola for melting iron for molds erected. In this department 25 more hands will be employed. Shop No. 3 is to be extended to double its present floor space. This is where erection of large machines takes place and the extension of this shop means the employment of 75 more hands. The brass foundry is to be enlarged and will give employment to 20 more men. The above improvements will be started as soon as plans are finished, and will be rushed to completion as rapidly as possible. The Bullock establishment is now rushed with business to such an extent that it could keep a force at work day and night for some time to come.

Among recent contracts taken by the Osborn Engineering Co., Cleveland, are the following: Fireproof storage warehouse, Hough & Keenan Storage & Transfer Co., Pittsburg; eight stories, to cost about $80,000, steel frame concrete fireproofing to be one of the best and finest equipped storage houses in the West; four-story building to be erected at Fremont, O., for the National Carbon Co., of Cleveland. The structure will be 100 x 300 ft., steel frame and concrete floors.

Work on the three new buildings to be erected by the Frost Mfg. Co., Galesburg, Ill., is progressing rapidly, and the structures will be completed within 60 days. A large hydraulic flanging press is being installed. The company recently shipped a consignment of seven boilers to Havana, Cuba, and additional shipments are to be made to that island.

The new railroad repair shops of the Bangor & Aroostook and Northern Main Seaport railroads will be located at Milo, Me. Erection will probably be commenced this summer.

Brown Brothers, Spokane, Wash., manufacturers of steam boilers, roofing and cornice work, are having plans prepared for a building that will be larger and better equipped than the one recently destroyed by fire. The plant will be 70 x 90 ft., two story, brick and stone, and will be up to date in every respect.

The Iowa Malleable Iron Co., Fairfield, Ia., is enjoying a prosperous business. The company expects to build an addition to its foundry, annealing room and shipping room this summer. It will not be in the market for machinery.

The Mountain State Gas Stove & Mfg. Co., Moundsville, W. Va., recently incorporated, has erected a new plant 60 x 22 ft., two stories. The company expects to manufacture a general line of gas heaters, water heaters, stove pipe and catsup bottle tops. It expects to be in operation about May 1.

The Kenton Iron & Stel Co., Mason City, W. Va., whose plant was recently destroyed by fire, has rebuilt one of its buildings, 200 x 45 ft., and has one-half of it under cover. The rest of the plant will also be rebuilt.

The Atlas Wire Co., Peoria, Ill., recently incorporated, will immediately begin the erection of its plant at South Bartonville, a suburb of Peoria. The main building will be 300 x 120 ft. The company will manufacture steel wire and wire nails. The output will be about 75 tons per day.

The work of getting the new furnace of the Woodward Iron Co., Woodward, Ala., in readiness for iron making is being pushed. It is expected that the stack will be ready to blow in within 30 days.

Extensive plans are now being carried into effect at the steel casting plant of the Falk Co., Thirty-first street, Milwaukee, in the Menominee valley, to double the output by July 1. All the new buildings will be of brick, concrete and steel. A wing 225 x 80 ft. will be constructed north of the foundry, and will parallel the foundry addition 175 x 100 ft. This wing will have an electric crane and will be used as an annealing, cleaning and shipping room. The company now has one Wellman tilting acid furnace and another Wellman furnace will be installed, but it will be basic instead of acid. The Falk Co. has had a very rapid growth. Five years ago the foundry was 175 ft. long, and in that period the business of the company has increased to such an extent that it has become necessary to twice double the capacity.

General Industrial Notes :—

Geo. G. Prentice & Co., machinery manufacturers, will shortly occupy their new works on Fair Haven Heights, New Haven, Conn. This is a modern, heavily constructed brick building and will be equipped with modern appliances for high grade machine work. The main building is 75 x 120 ft., four stories high. A two-story brick addition, 60 x 60 ft., contains a 100-h. p. Corliss type engine and two 125-h. p. boilers. Facilities for handling freight are complete and include a spur track from the main line of the N. Y., N. H. & H. R. R.

The Canton Stove Mfg. Co., Canton, O., recently incorporated, does not expect to begin active operations until early fall. The present expectation is that the company will adapt existing buildings to its purposes. The company has not yet made a complete schedule of its equipment, which will be similar to that of other modern plants for the manufacture of stoves. The company will manufacture a few special styles of stoves, which will be sold direct to the user. Earl V. Coulston, who will manage the business, has been for the past four years sales manager of the A. J. Lindemann & Hoverson Co., of Milwaukee, and previous to that was an assistant in

the same line for the Cribben & Sexton Co., Chicago. His experience in the stove business began about 16 years ago at Royersford, Pa., where he served both the Buckwalter Co. and Lloyd, Wells & Co.

The New York Lock Corporation, Brantford, Canada, recently incorporated, will take over the works of the Brantford Lock Co., sold at auction some time ago for the benefit of the stockholders. The new company will start the works again within a short time.

The Bessie Ferro-Silicon Iron Co., which has its general offices in Columbus, O., and is remodeling the Bessie Furnace at New Straitsville, O., has placed a force of men at work and expects to have the furnace in blast early in May.

The Owen Machine Tool Co., Springfield, O., has relinquished its West Virginia charter and reincorporated under the Ohio laws. There has been no change in the management or personnel of the organization.

The payroll of the General Electric Co., Schenectady, N. Y., is now said to be the largest in the history of the company. The volume of orders is very large, especially for turbines.

G. M. Cassens has purchased the Sterling Machine Works, Quincy, Ill., from George Allen, who is now operating the plant.

The Means-Fulton Iron Co. has started to dismantle the plant of the Portsmouth Foundry & Machine Works, Portsmouth, O., and will ship the machinery of the machine and boiler departments to the Means-Fulton plant at Birmingham. The foundry will be left intact for the present.

The Jersey City plant of the Cyclopean Iron Co. has been sold to Alfred H. Zugalla for $5,000.

The first installment of the new steel motor cars to be used on the Long Island's Western lines, when the electrification is completed this summer, has been received in Long Island City. The fitting out and equipment of the cars has begun at the company's shops outside Jamaica, L. I. There will be 135 of the steel passenger cars in all. Externally they do not look unlike the steel cars now in use in the Manhattan subway. Each has a seating capacity of 52 persons. They are absolutely fireproof.

The Carter & Hakes Machine Co., Winsted, Conn., whose plant was recently visited by fire, has rented a much larger building, better adapted to its requirements in every particular. The company is now ready to do business in a more satisfactory manner than ever before.

The recent sale of the Georgia Car & Mfg. Co., Savannah, Ga., for $32,500, was not confirmed by the court, which has since issued another order authorizing Wm. V. Davis, secretary and treasurer of the Savannah Trust Co., to dispose of the plant at private sale within the next 60 days at not less than $40,000. If the sale is not made within that time Mr. Davis will advertise the plant for sale at public auction; the upset price being 40,000, and any sale being subject to confirmation of the court.

Arnold & Jack, of Athena, Ore., have purchased an interest in the Zeigler & Mays' Machine Shop, of Pendleton, Ore., and will rearrange the shops at once.

The Perth Amboy Foundry & Machine Co., of Perth Amboy, N. J., recently incorporated with a capital of $100,000 to do a foundry and machine shop business, has secured a large tract of land and building, where it is installing machinery and making preparations to begin work.

New Railway Equipment.

The new isthmian canal commission on April 21 ordered 24 85-ton double tender locomotives for the Panama railroad, to be used in the construction of the canal. This is the first order looking to the double tracking and re-equipment of the road so as to enable it to take care of the increasing business to be brought to it by the reduction of rates and also to be of the maximum efficiency in the construction of the canal. Very soon about $1,500,000 worth of 75 lb. steel rails will be ordered. The contract for furnishing the locomotives was let to the American Locomotive Co. at $12,050 each, which was the lowest bid. The contract calls for their delivery at Colon not later than July 1." I intend to make dirt fly," is the declaration made by Chairman Shonts.

The Chicago Southern is having 80 locomotives built at the Schenectady works of the American Locomotive Co. The Chicago, Rock Island & Pacific has ordered, or will order during 1905, 115 locomotives. The Illinois Central has ordered 25 consolidation and 10 switch engines of the American Locomotive Co. The Keystone Coal Co., Philadelphia, has ordered 500 cars of the Standard Steel Car Co. The Chicago, Rock Island & Pacific has ordered 200 freight cars of the American Car & Foundry Co. The Chesapeake & Ohio has ordered 1,500 gondola cars from the Pressed Steel Car Co.

Lake Superior Corporation.

The two blast furnaces of the Algoma Steel Co. (Lake Superior Corporation) at Sault Ste. Marie, Ont., have been making good outputs. The coke furnace, which is 80 ft. x 15½ ft. and rated at 250 tons a day, produced 306 tons in 24 hours one day last week. The charcoal furnace has an output of 130 to 140 tons a day. In the rail mill a recent record was 649 tons in 24 hours. The rails now being rolled for the Canadian Pacific railroad conform to a strict specification both as to chemical and physical requirements. The phosphorus limit is .085 percent. Thus far the company's seconds have not been of sufficient tonnage to fill its orders for seconds. Minnesota ores and Pocahontas coke are used in the Algoma Steel Co.'s blast furnaces. The company's own Helen mine will ship this year to Ontario and Ohio ports, the estimated output being 240,000 tons. A second ore bridge is about to be erected in the furnace yard, the contract having been taken by the Wellman-Seaver-Morgan Co., of Cleveland.

R. Krausse, until recently superintendent of the works of Krausse & Schneck, Milwaukee, Wis., has withdrawn his interest. Chas. W. Schneck, Henry P. Schneck and Otto W. Schneck now constitute the new firm, which will be known as Chas. W. Schneck, Bro. & Co.

The personal property of the Crum Lynne Iron & Steel Co. was recently sold by the receiver. The Benjamin Iron & Steel Co., Buffalo, N. Y., purchased all the Swedish muck bar and forging scrap which the company had on hand. E. B. Leaf & Co., Philadelphia, purchased 590 tons of charcoal bloom bars and about 75 tons of puddle bars. Potts & Wittman, Philadelphia, purchased 200 tons of bars.

The property of the Lansing Iron & Engine Works, Lansing, Mich., has been sold at auction to the Wormer Machine Co. at Detroit for $18,350.

The Aultman Co., Canton, O., whose affairs are now in the hands of J. J. Sullivan, receiver, owes about $4,500,000 counting the direct and indirect liabilities. The assets of the company, as shown by the report of the appraisers, have a value of $287,000. This appraisal was based on the proposition that the company is to be formally closed out. The value of the assets of the company as a going concern would be considerably larger. The creditors' committee is trying to hold the claims together so that the assets can be bought in instead of being disposed of at a sacrifice.

The Thole-Phillips Mfg. Co. has been incorporated with a capital of $50,000 at Florence, Ala. This company succeeds the Thole Stove Mfg. Co., whose plant was recently removed to East Florence and enlarged. The officers are: Henry H. Thole, president; Thomas J. Phillips, secretary and treasurer.

The Jones & Laughlin Steel Co. has purchased the Halpin mine at Ironwood, Mich., which was operated in a small way a few years ago.

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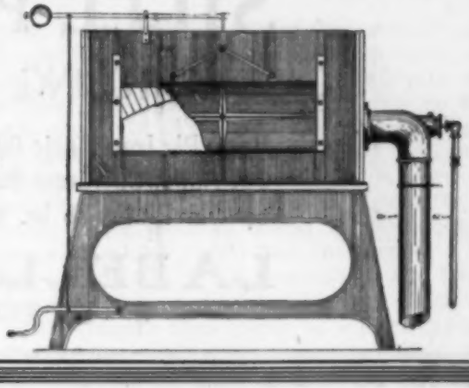

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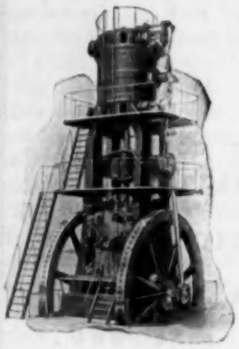

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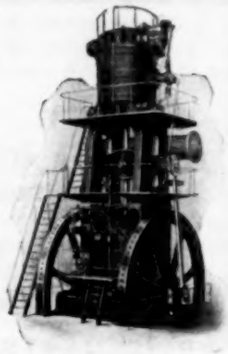

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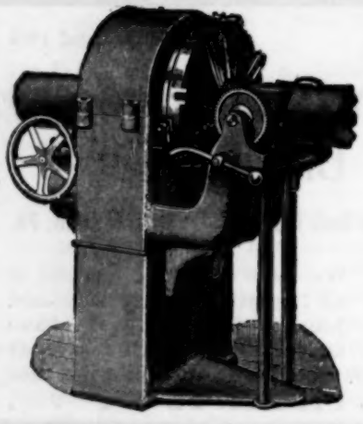

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